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M E M O

TO: Carole A. O'Brien, R.R. Short, A.F. Budge
FROM: Don White
DATE: April 2, 1989
SUBJECT: Dos Cabezas auriferous silica flux submittal by Queenstake

Queenstake Resources Ltd. of Vancouver, B.C., has been involved nearly three years at their Dos Cabezas project S.E. of Willcox, Arizona. They are now seeking a partner to finance further exploration and development. Thus Carole had me look at the property. I spent most of March 31st, stopping off enroute to Ash Peak, to review the data and see the underground workings, hosted by their project geologist, Tim Pearson.

Queenstake has a lease on several patented claims from the Mulwinkle family and has ringed that with unpatented claims. One of four recognized vein segments is the Gold Prince mine with some production history. It yielded about 5,000 s.t. of high gold grade, oxidized, free-milling ore long ago and approximately 14,000 s.t. at 0.33 oz/t Au to Phelps Dodge between 1983 and 1986. The P.D. production by their Small Mines Division went to the Douglas smelter, now closed down. Dos Cabezas is within competitive road-haul shipping distance of several other copper smelters.

Queenstake's program has defined about 30,000 s.t. at 0.3 oz/t Au of proven and probable Gold Prince reserves, most of which are below their presently active 500-level adit. A new 800-foot crosscut would be needed to access those reserves.

Queenstake has further tried to apply its understanding of the Gold Prince ore lense to the remainder of its property. They have progressed as far as surface mapping and sampling but need funding to drill test their targets. Success of the same scale as the Gold Prince would be another lense totalling about 50,000 s.t. at 0.3 oz/t Au, 2.0 oz/t Ag. There is some fair chance of locating such a target but it wouldn't be easy. Steep terrain and small target dimensions (steeply dipping lenses about 350 ft. in diameter, 6 ft. average thickness) would require tightly spaced drilling.

The likely reserve wouldn't justify the capital costs of a mill so custom milling or sale as smelter flux would be required. Queenstake's plan now is to produce from the small reserve above their 500-level. They are now shrinkage stoping and have trucked three 500 s.t. shipments to P.D.'s Hidalgo smelter in the last few months. That material has averaged 0.3 oz/t Au, 2.0 oz/t Ag, 76% silica, 7% alumina, 2% lime, 0.2% Cu, 0.3% Pb, 0.2% Zn and 5% Fe. Iron and lime are not likely to climb any higher. Smelter penalties have been applied only for the minor alumina excesses.

Alumina enters the product both as contained clasts of carbonaceous shale and as overbreak from the walls. Most of the production is from fault-filling quartz veins containing mixed sulfides. Gold is proportional to pyrite content while silver is tied more to galena and sphalerite abundances. Oxidation extends to just below the 300 level.

Carole A. O'Brien, R.R. Short, A.F. Budge
April 2, 1989
Page 2

The principal control on mineralization is the major Apache Pass fault zone. The Gold Prince ore lense occurs at a cymoid of one major fault splay where it coincides with some favorable sedimentary wall rocks. So the combination of structure and stratigraphy is important. There is no alteration extending far enough from mineralization to be an aid to exploration.

Queenstake's expenditures over 2 to 3 years have totalled about \$1 million. They ask \$2.5 million over the next 3 years for a newcomer to earn 50% in the program. Such a program stands a modest chance of locating a twin to the Gold Prince, another 50,000 s.t. at 0.3 oz/t Au (15,000 contained ounces or \$6 million gross at \$400./oz).

Drilling to date confirms that there is very little potential for discovery of any larger disseminated deposit. Precious metal grades diminish rapidly away from the main structures and vein system. Under the circumstances, the discovery costs per ounce and subsequent development and mining costs do not justify the joint venture. Only if the property were available in the future without joint venturing and with a higher gold price could I recommend Budge's involvement.

DW:sk



1987 Annual Report

including 1988 First Quarter Report

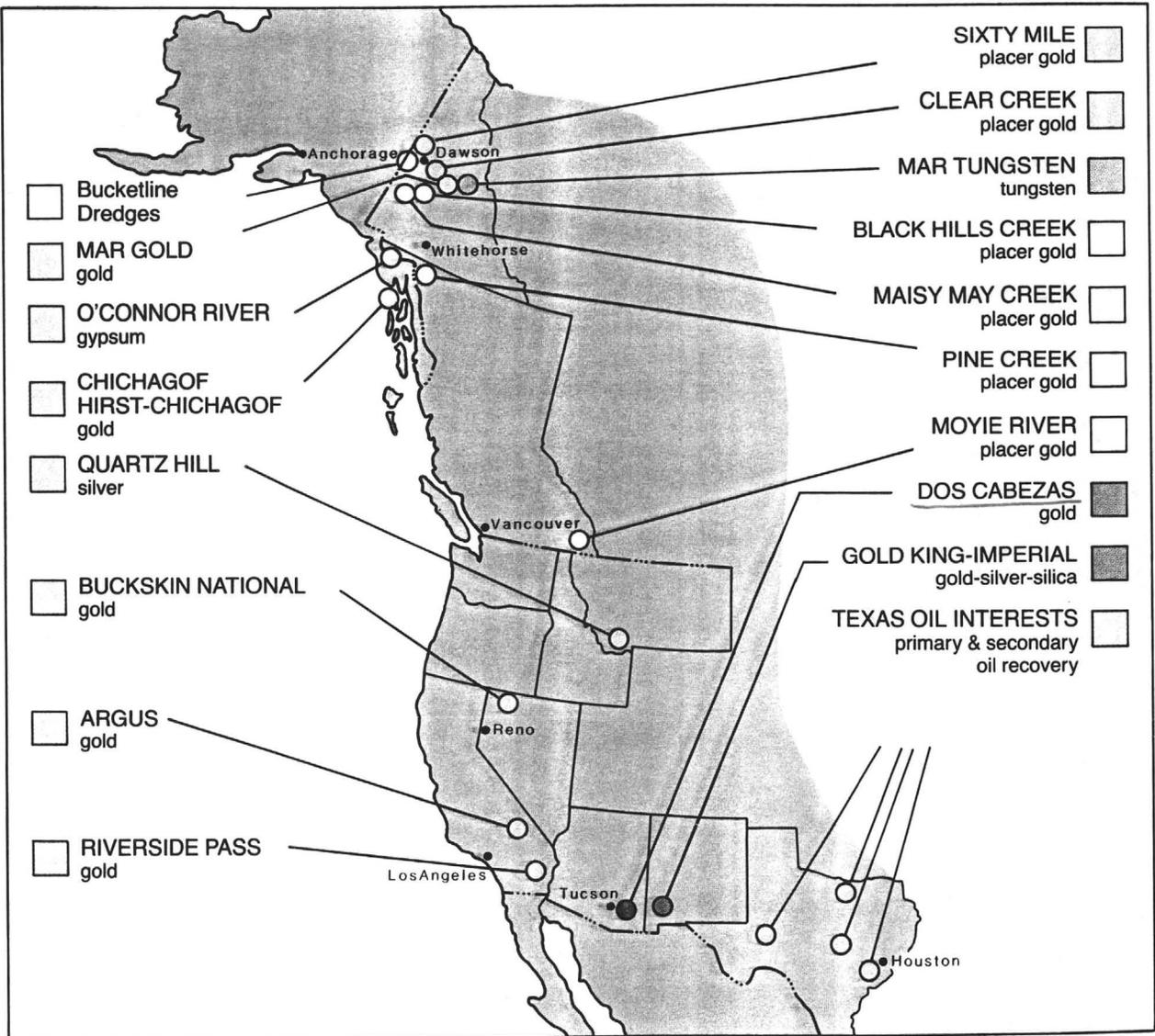
Front cover:

Wayne Lerner, Yukon placer manager, and Ed Kolody, 1987 Pine Creek Manager inspecting Queenstake's Pine Creek, B.C. mining operation. A large excavator loads rock trucks which carry the pay gravels to a fixed washing plant where the placer gold is recovered. In 1987, the Pine Creek operation produced 7,002 ounces of gold.

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Queenstake Property Locations



- Bucketline Dredges
- MAR GOLD gold
- O'CONNOR RIVER gypsum
- CHICHAGOF HIRST-CHICHAGOF gold
- QUARTZ HILL silver
- BUCKSKIN NATIONAL gold
- ARGUS gold
- RIVERSIDE PASS gold

- SIXTY MILE placer gold
- CLEAR CREEK placer gold
- MAR TUNGSTEN tungsten
- BLACK HILLS CREEK placer gold
- MAISY MAY CREEK placer gold
- PINE CREEK placer gold
- MOYIE RIVER placer gold
- DOS CABEZAS gold
- GOLD KING-IMPERIAL gold-silver-silica
- TEXAS OIL INTERESTS primary & secondary oil recovery

- tungsten reserve
- hardrock projects funded by joint ventures
- hardrock projects funded by Queenstake
- placer reserves and royalty interests
- placer properties in production
- oil properties



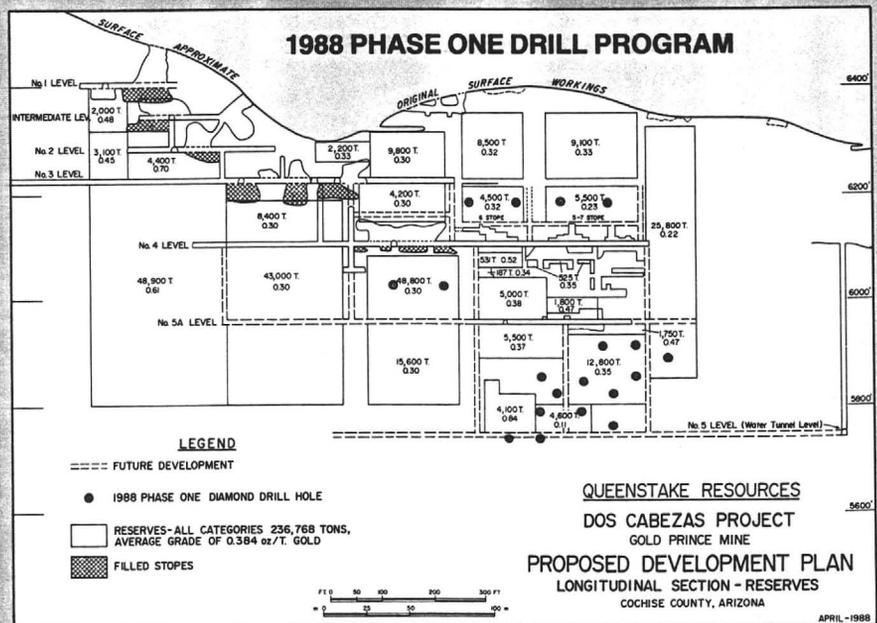
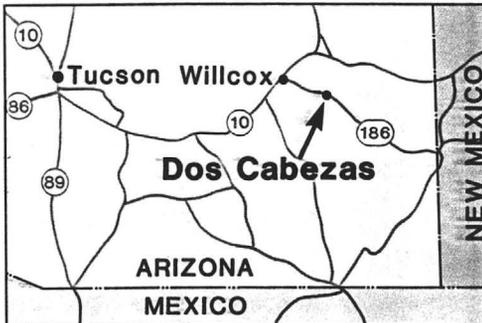
Dos Cabezas, Arizona

In 1987, Queenstake conducted an intensive underground sampling program at the Gold Prince Mine, aggregating over 600 samples. All principal structures were sampled at 5 or 10 foot centers. Following the sampling program, underground rehabilitation, construction of surface facilities, installation of services and mining equipment acquisition were completed.

A 6,000 foot underground diamond drilling program is planned at the mine to evaluate the extensions of ore reserves defined in Queenstake's 1987-1988 mapping and sampling program and by 9,000 feet of previous diamond drilling done by Phelps Dodge Corporation between 1983 and 1986. A series of three en echelon gold bearing quartz-sulfide veins will be tested in the program, with the goal of bringing the reserves to the drill indicated category. A feasibility study will then be undertaken to evaluate the deposit and define a mining development plan.

Drilling will be conducted by a contractor using a new underground drill recently purchased by Queenstake. The drilling will be done from both existing underground drill stations on the 5A Level and from new stations being constructed on the 5A and 4 Levels of the mine. The vein system will be tested along nearly 1000 feet of strike length and 500 feet of vertical extent.

Preliminary flotation and cyanidation test work conducted by Bateman Metallurgical Laboratories in Sparks, Nevada has been completed, with satisfactory gold recoveries using a combination gravity-flotation-cyanidation circuit. Additional testing is planned to further define grinding and selective flotation variables for the ores. Column leach cyanide testing is planned on near surface stockwork-hosted oxide ores which may be amenable to open pit heap leach technology.

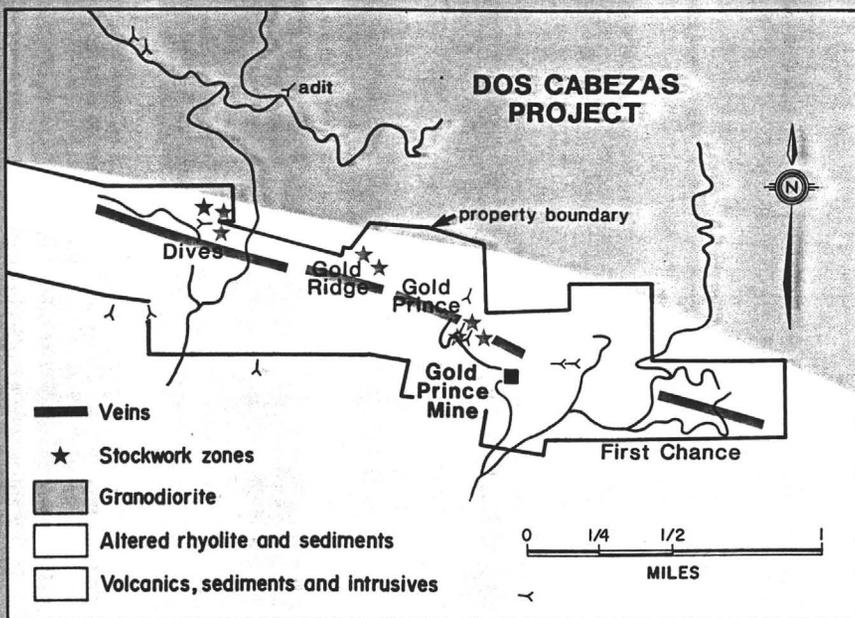


Mine equipment purchases from former operator Phelps Dodge Corporation helped to speed the project to completion at substantial savings over projected equipment costs.



View from the Gold Prince Mine, Dos Cabezas, looking past the home of Kay and Lewis Stickradt (head of mine security) to the flats.

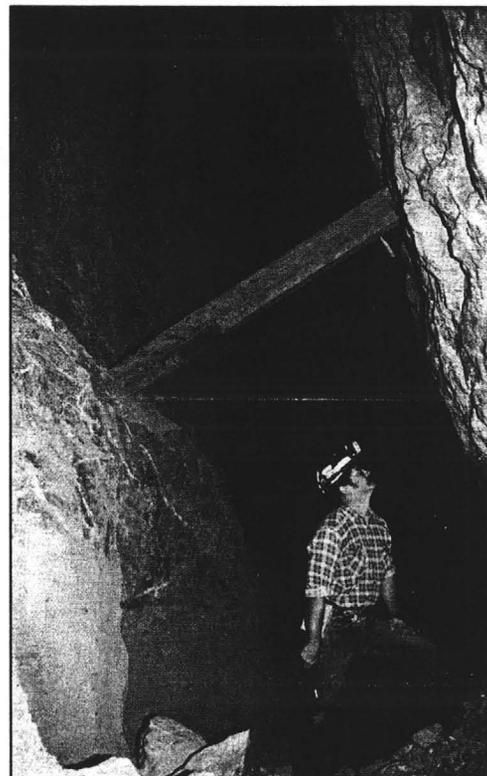
Additional claim locations made by Queenstake have almost doubled the project area, including both lode and mill site locations.



The mine rehabilitation program was directed by Mine Manager, Al Voirin, with Project Geologist, Tim Pearson.



Al Voirin, Dos Cabezas mine manager (l) and Tim Pearson, project geologist (r), inspecting Dos Cabezas structure.



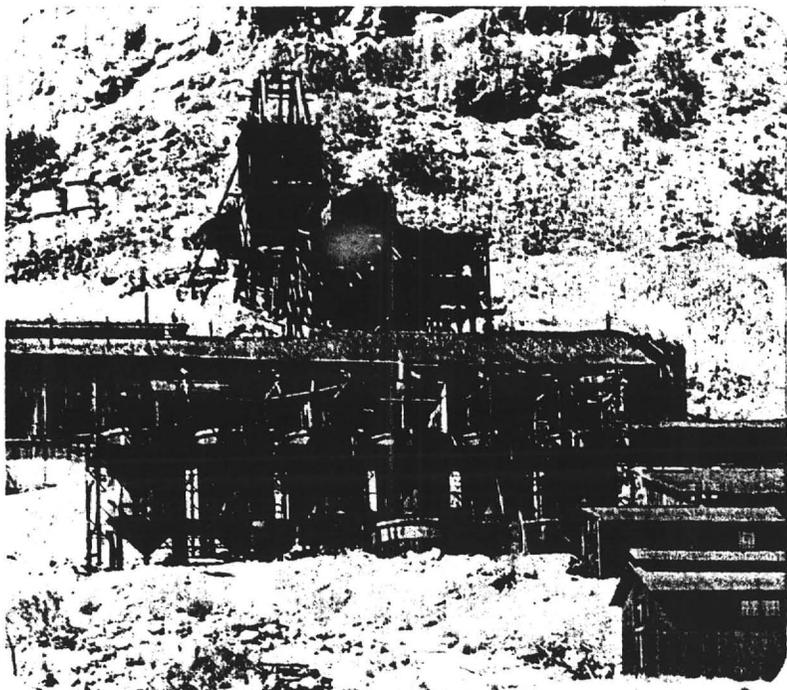
Dave Hembree, Queenstake's U.S. manager of exploration, examining underground workings in the Gold Prince Mine, Dos Cabezas project. In 1988, a 6,000 foot underground drilling program is planned to define reserves for a production decision.



ARIZONA LODE GOLD MINES AND GOLD MINING

by

Eldred D. Wilson, J. B. Cunningham, and G. M. Butler



Bulletin 137 *Originally 1934*

Revised 1967

Reprinted 1983



Arizona
Bureau of Geology and Mineral Technology
Geological Survey Branch

A Division of the University of Arizona

for 1,800 feet, through the "Big Ledge" and nearly through the shale belt. In the shales, it cut four separate, westward-trending veins that have been opened by drifts from 35 to 360 feet long. As exposed, these veins range from less than one foot to 12 feet wide.

The Dives veins consist of coarse-textured white quartz with scattered bunches and disseminations of galena, pyrite, sphalerite, and chalcopyrite. Their gold occurs in the sulphides, mainly the galena, and is free milling only near the surface. According to A. B. Wadleigh,¹⁶² Superintendent of the Consolidated Gold Mines Company, the ore carries from one to 2 ounces of silver per ounce of gold. Graphite is abundant in the wall rock.

GOLD RIDGE OR CASEY MINE

The Gold Ridge or Casey property, controlled by Mrs. J. H. Huntsman, of Tucson, is about 2½ miles north of Dos Cabezas and immediately east of the Dives group. This deposit was located in 1878 as the Juniper mine.¹⁶³ Hamilton¹⁶⁴ states that, during the early eighties, the Juniper claim was one of the most important in the district and, prior to 1881, produced \$6,000 worth of gold and silver. In 1881-1882, 100 tons of its ore, containing \$45 worth of gold per ton, was treated in a mill at Dos Cabezas. During the early nineties, the Casey brothers worked the mine in a small way. A small production was made in 1915-1917. In 1917, the owners of the property organized the Dos Cabezas Gold Ridge Mining Corporation which carried on some development work. During 1933-1934, William Dorsey operated the mine with twelve to fifteen sub-lessees. Their production from July, 1933, to June, 1934, amounted to 578 tons of ore that contained an average of 0.637 ounce of gold and 0.4 to 2.1 ounces of silver per ton and yielded a total net smelter return of \$6,785.

The gold-bearing veins of this property occur within the same belt of shales as the Dives mine. (See Page 117). Underground workings are from an upper and a lower adit, connected with a winze. The upper adit has about 400 feet of drifts and stopes on a vein that ranges up to 6 feet in width. The lower adit connects with a 125-foot winze and some 700 feet of exploratory drifts on several veins.

The Gold Ridge veins consist of coarse-textured white quartz with erratically scattered bunches and disseminations of galena, pyrite, and chalcopyrite. Their gold occurs in the sulphides, mainly the galena, and is free milling only near the surface.

GOLD PRINCE MINE

The Gold Prince mine is east of the Gold Ridge property and 2¾ miles northeast of Dos Cabezas, at an altitude of 5,900 feet. It was located in 1878 as the Murphy mine. During the eighties,

¹⁶² Oral communication.

¹⁶³ Unpublished notes of M. A. Allen, 1920.

¹⁶⁴ Hamilton, P., Resources of Arizona, 1881 and 1883.

T. C. Bain mined small amounts of high-grade ore from the property.¹⁶⁵ From 1918 to 1921, the Gold Prince Mining Company did more than 3,000 feet of underground development work and made a small production with a 25-ton mill. In 1931, the Dos Cabezas Gold Mining Company did some development work on the property and shipped several cars of gold ore. During 1932-1933, lessees shipped about fifty-four cars of ore that is reported to have averaged \$12 in gold per ton.

Here, the westward-trending belt of metamorphosed, steeply northward-dipping Cretaceous sandstones and shales, described on page 117, forms a moderately hilly terrain. According to Leonard,¹⁶⁶ "The ore deposit consists of a series of lenticular bodies of gray quartz containing auriferous galena and pyrite, which make up a vein system or lode confined to an intensely sheared fracture zone in shale country rock. The shear zone is from 35 to 40 feet wide between very definite hanging and foot walls. The individual lenticular quartz veins range up to 5 feet in width and about 100 feet in length. They occur on both walls and in interconnecting and overlapping lenses in the sheared, schistose rock within the vein zone. The general strike of the vein system is about N. 70° W. and its dip 65° S.

"The surface ore was possibly somewhat richer than the ore that occurs below, owing to the removal of sulphides and substances other than gold. Oxidation and solution of sulphides does not appear to have extended for more than about 200 feet downward from the surface." The shale shows considerable alteration to graphite.

Underground workings of the Gold Prince mine include five adits with a total of more than 3,100 feet of drifts within a vertical range of 750 feet. The lowest or No. 5 tunnel, which is located near the eastern end of the property, largely in granite and diabase, trends northward for 900 feet and obliquely for 700 feet through a fault zone 500 feet wide.

LE ROY PROPERTY

The Le Roy property is 1½ miles northeast of Dos Cabezas. Its principal claims, which were located in 1878, passed through several ownerships, and were obtained by the Le Roy Consolidated Mines Company prior to 1920. A few thousand tons of gold-silver-lead ore were produced, but no records or estimates of the amount are available. In 1925-1926, the Dorsey brothers shipped, from the Le Roy shaft, five cars of carbonate ore that contained from \$35 to \$40 worth of gold, silver, and lead per ton.¹⁶⁷ In 1926-1927, the Arilead Company is reported to have shipped several cars of ore from the Climax shaft. During the following year, dump material was treated in a small mill. Dur-

¹⁶⁵ Allen, M. A., unpublished notes, 1920.

¹⁶⁶ Leonard, R. J., unpublished notes, 1933.

¹⁶⁷ Oral communication from Wm. Dorsey.

ing 1928-1933, several cars of ore were shipped from the mine. In 1933, A. M. Bell installed a small mill on the property and produced some concentrates.

Here, granite, intruded by diabase dikes, forms rolling hills. The vein system strikes northeastward and dips about 65° SE. Its ore consists of coarse-textured grayish-white quartz with scattered pyrite, galena, sphalerite, and chalcopyrite.

Underground workings¹⁶⁸ on the Le Roy claim include an inclined shaft, more than 300 feet deep, with water at 70 feet. On the 70-foot level, the vein is 3 to 4 feet wide. Developments on the Climax claim include a 300-foot inclined shaft and more than 2,000 feet of workings. The vein ranges in width from a few to 8 inches and in places separates into a stringer lode 4 or 5 feet wide. Its ore occurs in erratically distributed bunches.

GOLDEN RULE DISTRICT

GOLDEN RULE OR OLD TERRIBLE MINE

The Golden Rule or Old Terrible mine, of northern Cochise County, is ¾ mile south of Manzano, a siding on the Southern Pacific Railway.

This property was located during the late seventies.¹⁶⁹ In 1883, the Tucson Star and the U. S. Mint Report credited it with a production of \$125,000 in gold. A yield of \$30,000 was reported for 1884, after which the next recorded output was in 1891 when \$12,000 worth of ore was shipped to Pinos Altos, New Mexico. In 1897, the mine was acquired by the Golden Queen Consolidated Gold Mining Company which built a small mill. Intermittent production continued through 1902 during which period the company was reorganized or purchased by the Old Terrible Mining Company. From 1905 to 1908, the Manzano Gold Mining Company operated the property. No work was reported for nine years afterward. Small intermittent production, largely by lessees, has continued since 1916. In 1933, the property was owned by Mrs. E. M. Jackson, of Benson.

The recorded production from 1833 through 1929 amounts to 9,543 ounces of gold and 317,088 pounds of lead, worth about \$224,000.

The mine is at the northeastern foot of the Dragoon Mountains where cherty, dolomitic, Cambrian Abrigo limestone strikes westward, dips 30° to 40° N., and is intruded by a small stock of granitic or monzonitic porphyry.

Mining has been done principally on three veins that lie from 25 to 40 feet apart, parallel to the bedding of the limestone. These veins have smooth, regular walls and are traceable for a

¹⁶⁸ Unpublished notes of Carl Lausen, 1923.

¹⁶⁹ History abstracted from unpublished notes of J. B. Tenney.

Carde

Don White
521 E. Willis St.
Prescott, AZ 86301
602-778-3140

Mr. Timothy Pearson
Queenstake Resources U.S.A., Inc.
P.O. Box 217
Willcox, AZ 85644

Dear Tim,

Thank you very much for the tour of the Gold Prince mine last week and for your patient laying out of exploration results and proposals. I believe you have well identified the structural and stratigraphic ore controls and have a good handle on how to go about finding more. The judgement call on the part of any investor will then be whether or not the probable size of the targets justifies finding costs and would be economic.

I shall pass on my impressions to Carole O'Brien and Ron Short of Budge (Mining) Ltd. and one of them will let you know whether they wish to pursue it any further.

Thanks again for your time and effort in familiarizing me with your program.

Sincerely,



Don White
Geologist, C.P.G.

DW:sk

cc: Carole A. O'Brien ✓

Scottsdale
copy

Jan. 20, 1989

Don White
521 East Willis St.
Prescott, AZ 86301

Dear Don:

Enclosed is all of the data we have generated so far on the Vulture Mine. I am still waiting for Ed DeWitt and Rob Kerrich to send me geochronology and oxygen isotope data, respectively. As I recall, you showed us a contour map of gold concentration in a cross section of the Vulture mine, based largely on assays of drill-core samples. Would it be possible for you to send me a copy of that map so that I could make a simplified version for publication along with the rest of the Vulture mine data?

Also enclosed is a copy of part of Scarborough and Meader's geologic map of the northern Plomosa Mountains. I hope it is useful.

Best regards,



Jon Spencer
Arizona Geological Survey (new name)
845 N. Park Ave.
Tucson, AZ 85719
(602) 882-4795 (new number)

Fluid-inclusion data from the Vulture Mine, west-central Arizona

Jon Spencer Arizona Geological Survey
John Duncan 845 N. Park Ave., Tucson, AZ 85719

January, 1989

The Vulture Mine mineral deposit is within and adjacent to an apophysis of a Cretaceous granitic intrusion (Fig. 1; Reynolds and others, 1988). Extreme Miocene crustal extension has affected the Vulture Mountains, including the area of the Vulture Mine. The rocks of the Vulture Mine area have been tilted approximately 90° to the west or southwest by movement on listric and/or planar normal faults. As a result of tilting, a vertical cross section of the deposit, the upper part of the Cretaceous stock, and the older host rocks is exposed in map view at the Earth's surface. The original orientation of the vein was approximately N11E 78NW, assuming no post-mineralization, pre-Miocene tilting (Fig. 2).

Fluid-inclusion salinity and homogenization data from samples of quartz veins reflect fluid conditions, at the approximate time of mineralization, through an originally vertical transect more than one kilometer deep. Fluid-inclusions in four samples from the structural base of the transect are characterized by the highest salinities and homogenization temperatures. The four samples define an approximately linear array on a salinity-temperature diagram (samples A, B, C, and D on Figure 3) that possibly represents mixing between a high-temperature ($>300^{\circ}\text{C}$ or higher), high-salinity (13 wt. % NaCl equiv. and greater) magma-derived fluid and a lower temperature (approx. 260°C or lower), lower salinity (5 to 6 wt. % NaCl equiv. or lower) hydrothermal fluid possibly containing a significant component of meteoric water. Both homogenization temperature and salinity are lower in fluid inclusions from samples at higher structural levels, including samples from the Vulture Mine, and a progressive decrease in temperature and salinity with decreasing paleodepth is suggested by the data (Figs. 4, 5).

FIGURE CAPTIONS

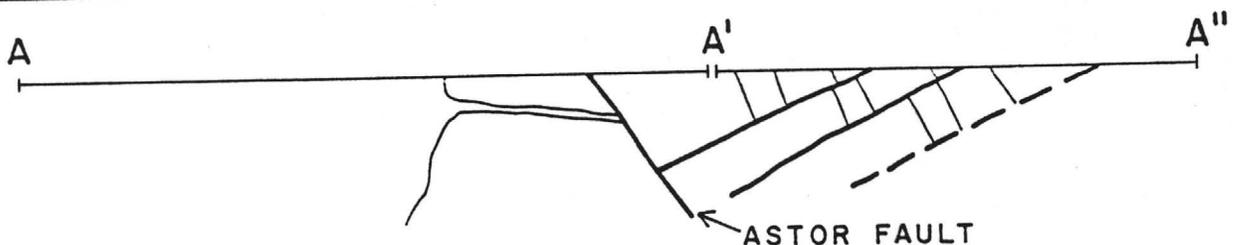
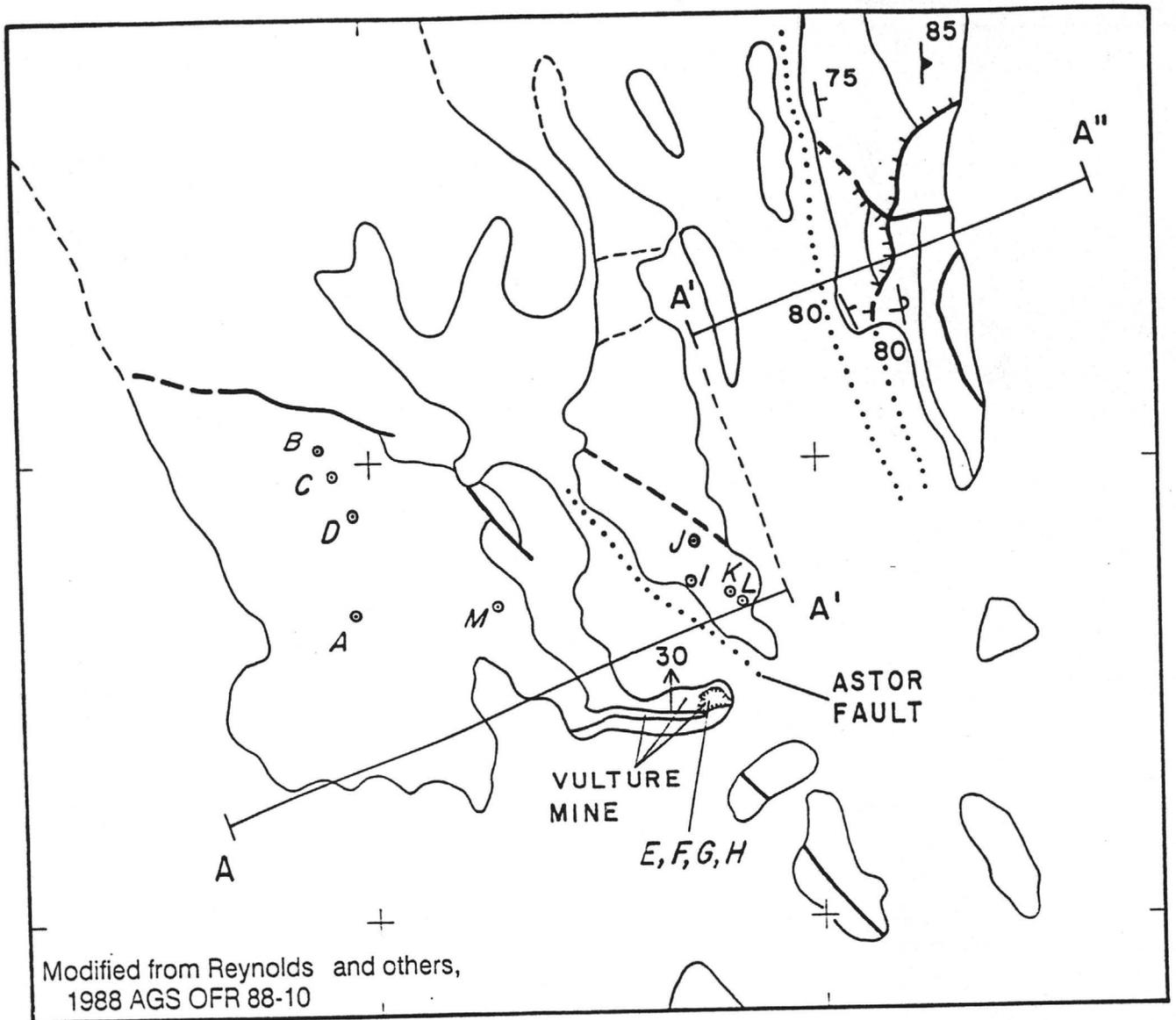
Figure 1. Simplified geologic map of the Vulture Mine area showing sample locations.

Figure 2. Stereonet showing restoration of Miocene rotation of Vulture mine vein.

Figure 3. Salinity versus homogenization temperature for fluid inclusions from quartz veins in the Vulture Mine area. Each point represents the mean for each sample. Error bars represent one standard deviation.

Figure 4. Paleodepth versus salinity (upper diagram) and homogenization temperature (lower diagram) for fluid inclusions from quartz veins in the Vulture Mine area. Paleodepth is distance perpendicular to approximately vertical contact at base of Miocene volcanic rocks that rest disconformably on the Vulture Mine block. Actual depth at time of mineralization is not known.

Figure 5. Fluid-inclusion data from the Vulture Mine area.



- | | | | |
|--|---------------------------------------|--|--|
| | Aphyric rhyolite (Miocene) | | Low-angle normal faults, dashed where inferred, dotted where concealed |
| | Tuff and altered rhyolite (Miocene) | | High-angle faults, dashed where inferred, dotted where concealed |
| | Basalt and andesitic flows (Miocene) | | |
| | Granite (Cretaceous) | | |
| | Metamorphic rocks (Early Proterozoic) | | |

Fig. 1

LOWER HEMISPHERE PROJECTION VULTURE MINE VEIN

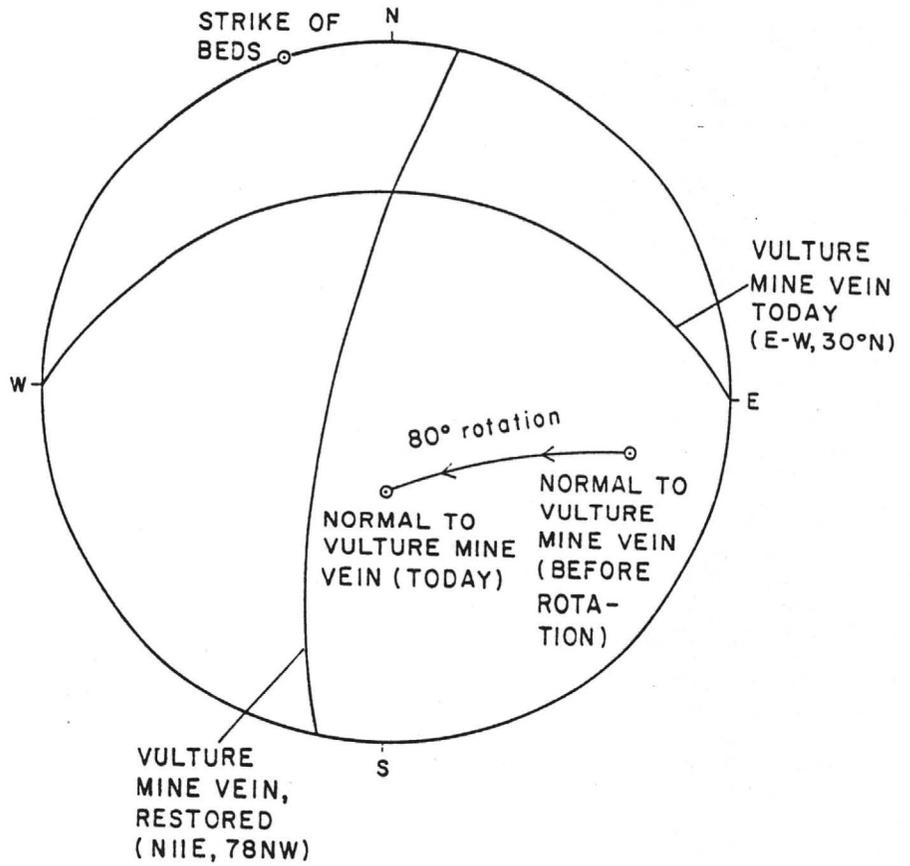


Fig. 2

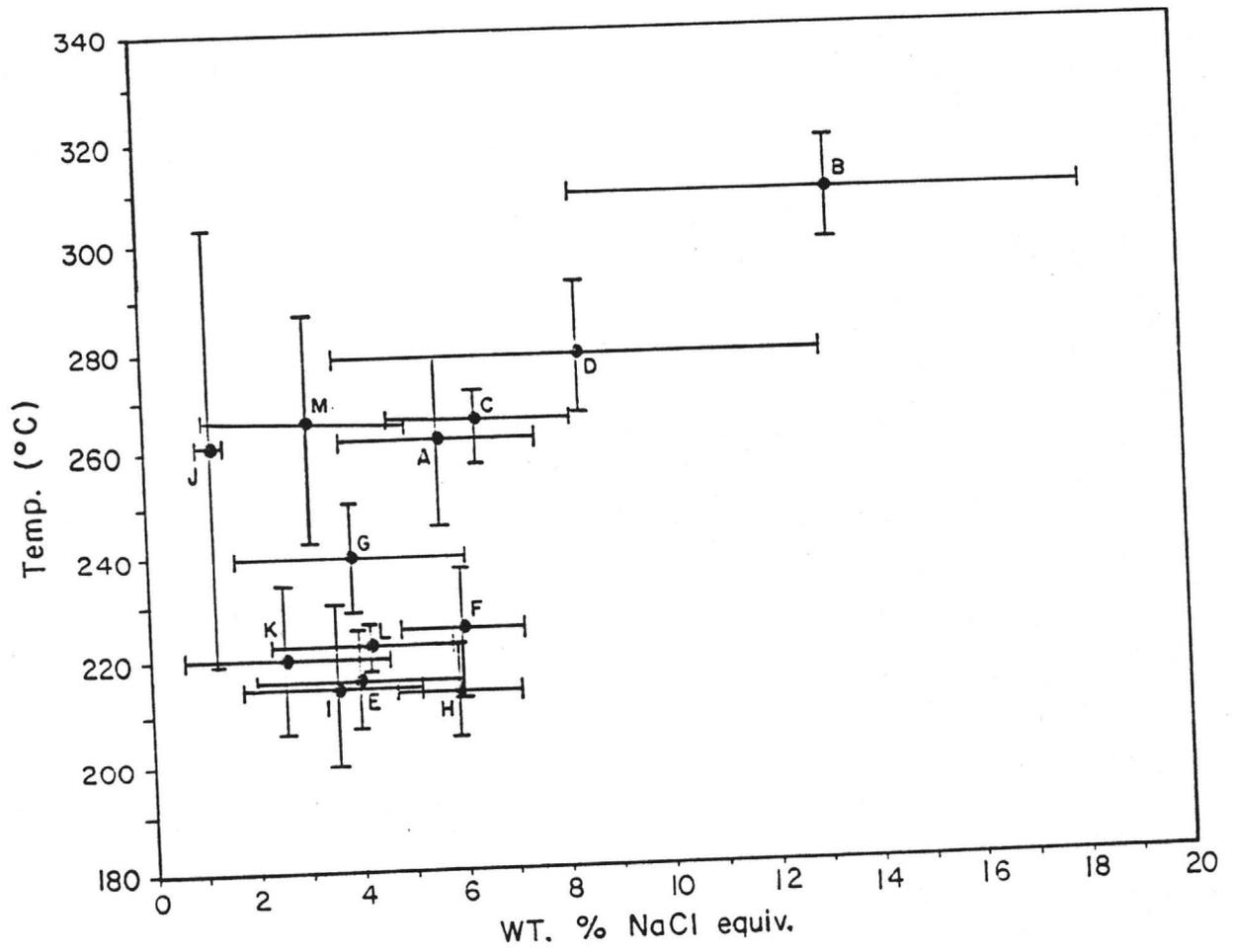


Fig. 3

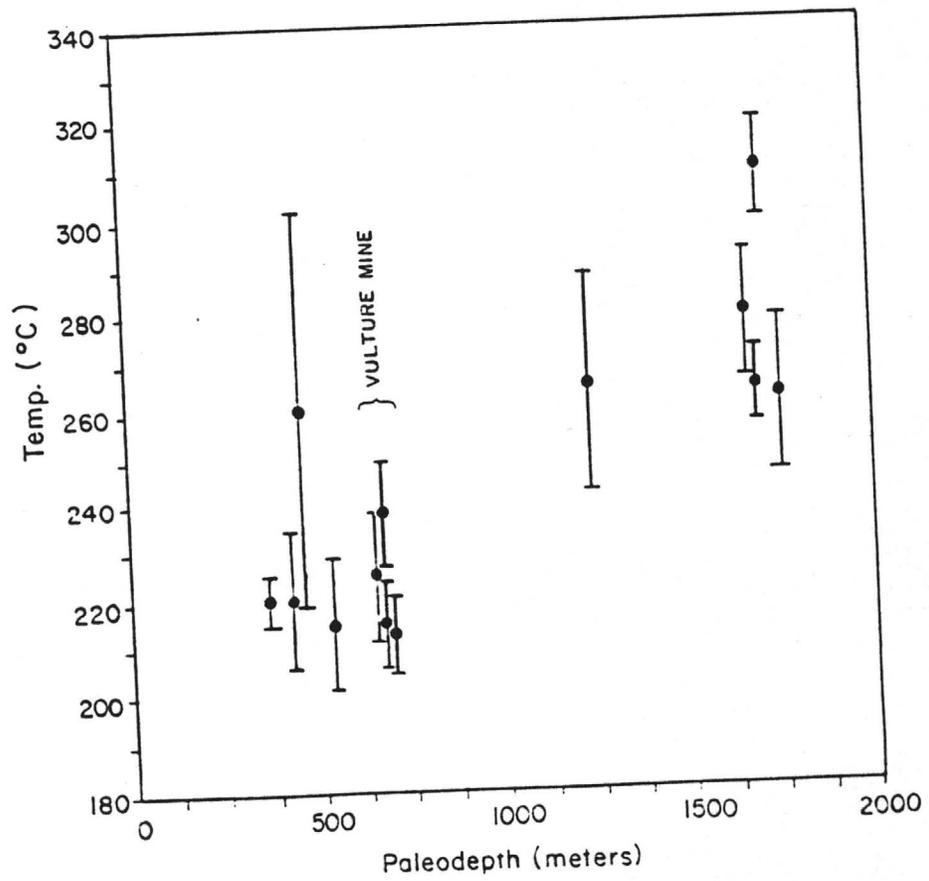
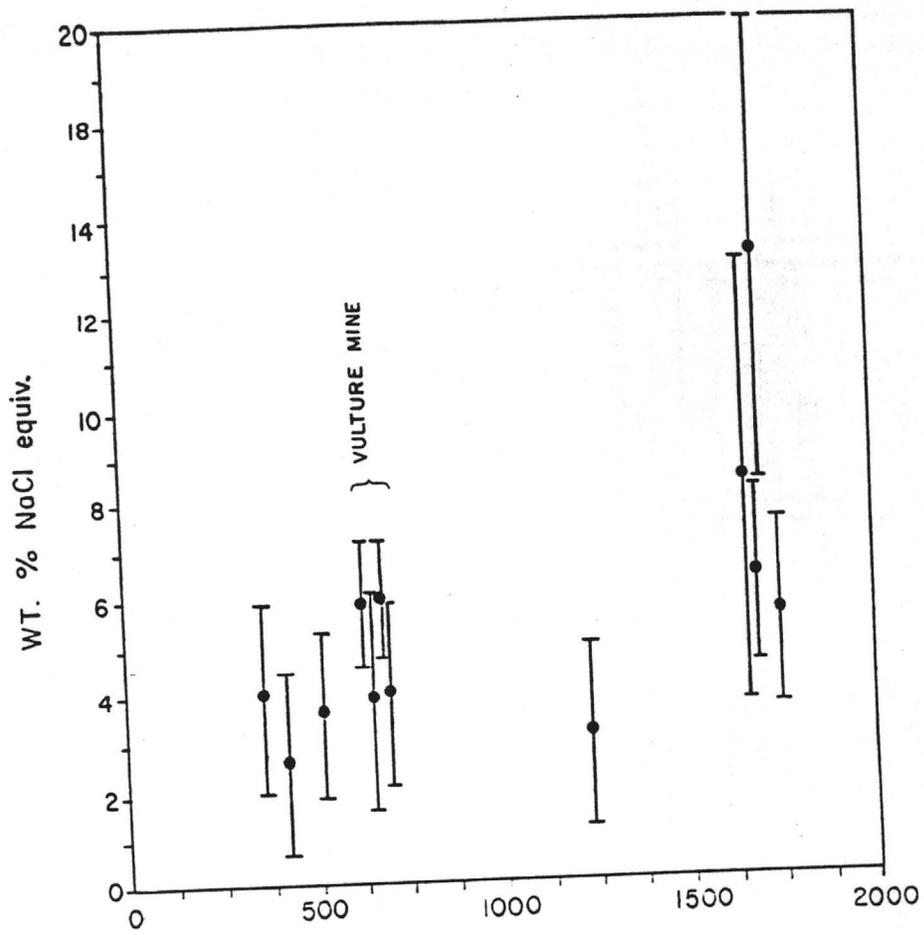


Fig. 4

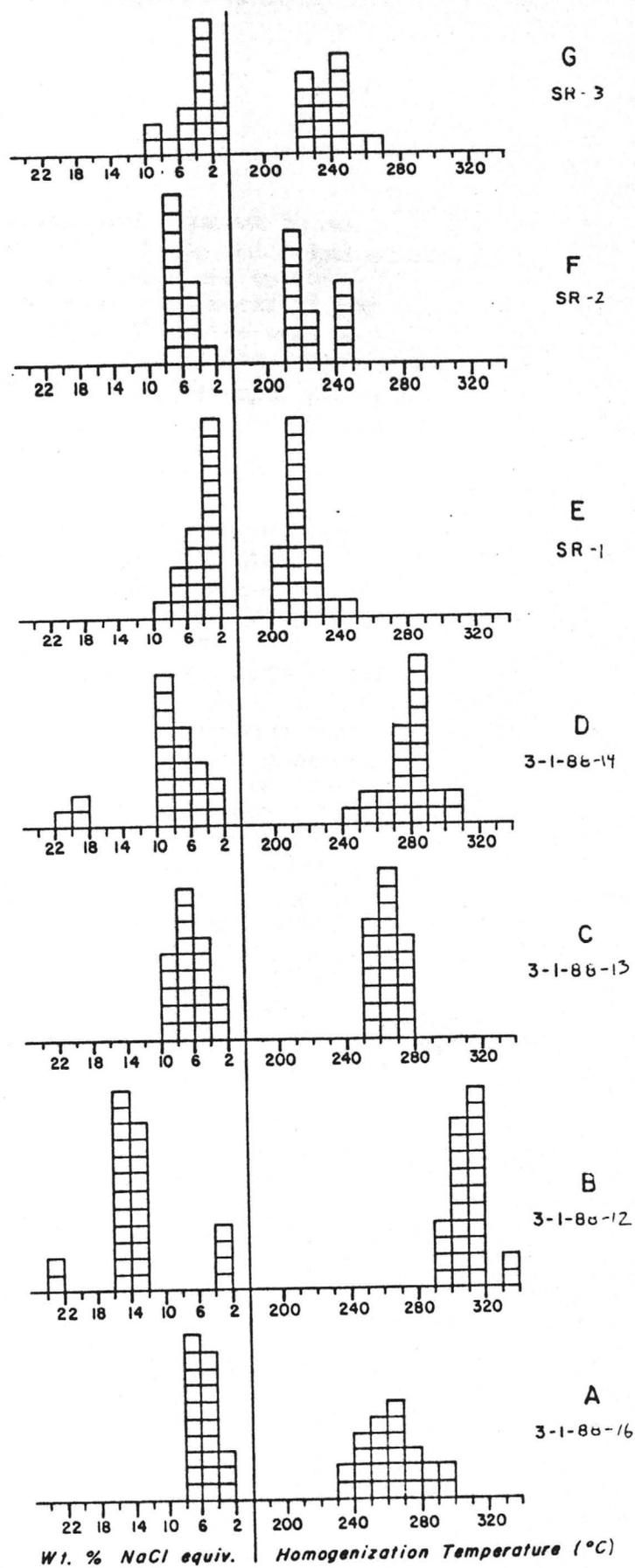
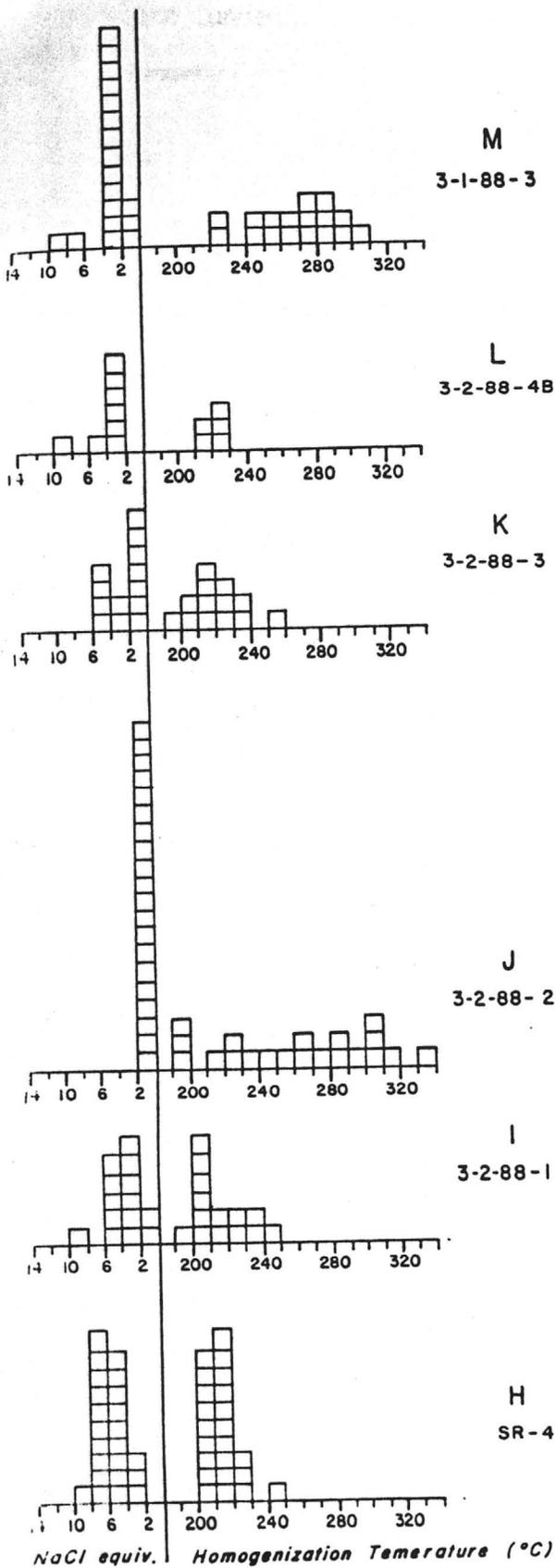


Fig. 5

FREEPORT-McMoRan GOLD COMPANY

A Subsidiary of Freeport-McMoRan Inc.

6110 Plumas Street
P.O. Box 41330
Reno, Nevada 89504
Phone (702) 826-3000
TWX 910-395-7008

*Carole - FYI,
No plans to do
this now but
maybe
later*

December 19, 1988

Mr. Donald C. White, Geologist
521 East Willis Street
Prescott, Arizona 86301

Dear Mr. White:

Your recent talk at the Northwest Mining Association Conference was most interesting. The picture you presented of gold adjacent to the massive sulfide at the United Verde Extension was fascinating. The many geochemical applications you discussed - weathering, iron oxides, relationship to base metal sulfides - would make a good expanded abstract for our industry!

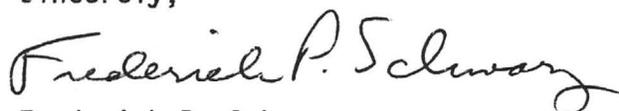
Thus, this note is to remind you that "Explore", the newsletter of the Association of Exploration Geochemists, would be most gratified if you could make a 1000-word precis of your presentation, or perhaps of a part of your presentation, available for quarterly publication. Inclusion of two or three illustrations would be most appropriate and welcome, also.

Manuscripts, per the format described in the November "Explore", should be double-spaced on paper and if possible on 5 1/4 inch IBM-compatible computer diskettes with ASCII (DOS) format. With discs, the article can go directly to typesetting. Measurements, etc., should be in the metric system.

Please consider submitting something for our industry forum... while the subject, organization, etc. of your presentation is still fresh in mind.

Again, I most enjoyed your talk. I will look forward to receiving a note on this most interesting example of mineralization in the Jerome District from you.

Sincerely,



Frederick P. Schwarz
Editor's Staff for "Explore"

xc: Chester E. Nichols, Editor
Files

Carole

Don White
521 E. Willis St.
Prescott, AZ 86301
602-778-3140

December 6, 1988

Paul A. Handverger
VERDE EXPLORATION, LTD.
2160 Old Jerome Hwy.
Clarkdale, AZ 86324

Dear Paul,

Thank you for your prompt response in approving the manuscript draft sent a couple weeks ago. The presentation went very well and was received with much interest by about 800 persons at the N.W. Mining Convention. That can not but help Verde's property position in the long term.

The NWMA officer there tell me the manuscripts become available as individual papers in March or so. They do not put together a proceedings volume as such. There was some discussion of collecting the papers from the two symposia on precious metals in and with Precambrian rocks and massive sulfides into a special paper. In that event Bob Hodder and I would probably rework the manuscript at least once again and have you see it before final submittal to the editors.

Accompanying is the version as presented to NWMA last week.

Sincerely,



Don White
Geologist, C.P.G.

DW:sk

Enclosure

cc: Robert W. Hodder
Carole A. O'Brien ✓
Ronald R. Short

Carole

Proof... major deposits missed by inappropriate sampling.

As shown in the example below, ignoring the possibility of "coarse gold" can result in missed anomalies and valuable deposits. Over 25 years of exploration and assaying experience by Bondar-Clegg has repeatedly proven that expert assessment of sampling characteristics pays off handsomely in

the quality and validity of exploration data.

For a relatively small up-front investment, Bondar-Clegg can provide a comprehensive sampling study that will put your odds of finding a deposit at the level specified by *you* so that you control your program, rather than leaving it to chance.

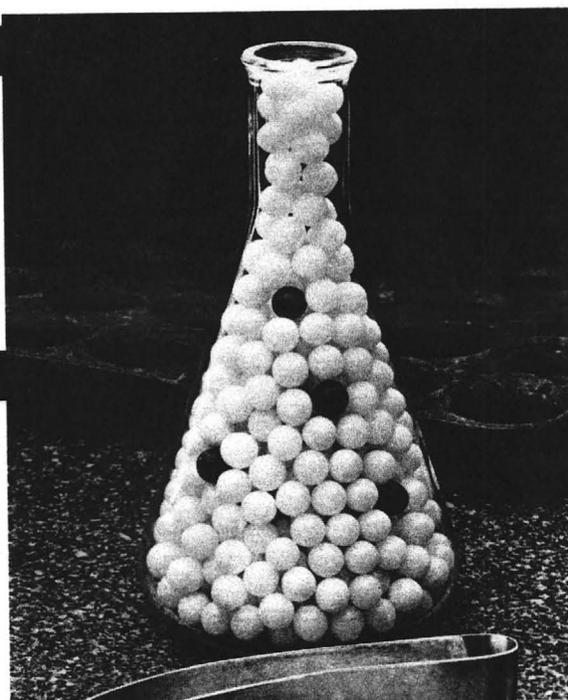
How deposits are overlooked: an example.

ASSUMPTIONS

- Black balls are gold spherical particles of 400 micron diameter.
- White balls are gangue.
- There are 900 grams of material.
- The "grade" is 0.10 ounces per ton.
- 30 assays at 30 grams each will be performed. No more than one gold particle will be collected in a single assay charge.

THE FACTS

- 25 of the assays will be below the detection limit of 0.002 ounces per ton.
- 5 of the assays will be over 0.6 ounces per ton.
- **Your "odds" of having an assay above detection for this sample are less than 17 per cent!**



BC
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Mining stakes its reputation on our analyses...as it has for over 25 years.

Bondar-Clegg, Inc.
Sparks, Nevada (702) 359-9330
Lakewood, Colorado (303) 989-1404

Bondar-Clegg & Company Ltd.
Ottawa, Ontario (613) 749-2220
N. Vancouver, B.C. (604) 985-0681

Chimitec Ltée
Ste-Foy, Québec (418) 683-1777

Fact: half of gold heap leaching operations fail due to inadequate testing.

During the past decade at least half of North America's gold heap leach operations have failed. In examining a number of these cases, Bondar-Clegg has found that the process was being taken for granted as "simple" with virtually every failure traceable to inadequate and/or incomplete test programs.

Bondar-Clegg applied its many years of geochemical and assay experience to this problem. In the early eighties, a process development center was established in Denver to focus on the comprehen-

sive testing of precious metals. A sample test list is shown below.

Many of Bondar-Clegg's customers have found that these test programs can pay off handsomely in terms of reduced scale-up costs, minimization of expensive mistakes, and expediency in plant design and construction.

Whether you are interested in "simple" cyanide-leach tests, or development of a process for complex sulfides, call Bondar-Clegg for your extractive metallurgical needs.

Essential tests for heap leach operations.

- Mineralogical factors.
- Ore permeability.
- Head and tail size/content distributions.
- Kinetic data.
- Protective alkalinity.
- Optimum cyanide dosage.
- Ore impurity levels.
- Crushing/agglomeration characteristics.
- 50-100 pound column-leach performance.
- Column performance as a function of ore type, feed-particle size, and time.



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Carole - My abridged list from the DMR listing, for your info - Don

DMR Arizona Au/Ag Resource Listing

FLUX category	Property	County	Millions Tons	oz/t		Remarks
				Au	Ag	
	Ash Peak	Greenlee	1.00		4.0	Presently producing both U.G. & O.P.
	Commonwealth tailings	Cochise	.25	.01	3.3	Presently shipping as SiO ₂ flux to Hidalgo Cu smelter
	Gold Prince	Cochise	.20	.5		Queenstake Res. exploring. Recently produced as U.G. flux mine.
	Mammoth Tiger	Pinal	10.	.04		Open pit production for San Manuel smelter.
	Reymont	Pinal	.94		4.5	" " " " Inspiration "
	United Verde	Yavapai	+1.0	+2.5	+2.0	Phelps Dodge owned < Surface drillable. Adit access from pit.
	U.V.X.	Yavapai	+ .05	+2.5	+2.0	A.F. Budge (Mining) Ltd. lease from Verde Explor. Ltd. Some higher grade

UNDERGROUND category

Brick	Santa Cruz	.02		5.0	
Commonwealth	Cochise	.01	.02	3.0	Drilled reserve
Congress	Yavapai	.35	.3	0.3	Niagara vein extn. Echo Bay driving decline.
Gladiator	Yavapai	.12	.4	3.5	NorQuest Res. 100 tpd flotation mill. Steam/rip-off.
Gold Bar	Yavapai	.02	.6		Sunshine Mining doing exploration.
Gold Prince	Cochise	.20	.5		Queenstake Res. doing explor. Flux producer
McCabe	Yavapai	.75	.35	2.0	Sten West Corp., sulfidic, on-site milling.
McCracken	Mohave	.40		8.0	Open pit & U.G.
Mystic	Maricopa	.05	.9		Terra Technologies doing explor.
Oatman	Mohave	.25	.2		Fischer-Watts
Transval	Pinal	.01	.63		Narrow vein. For sale by Dave Taylor.
Tyro	Mohave	.17	.13		C.I.P. system on property.
United Verde	Yavapai	+1.	+2.5	+2.0	Phelps Dodge controlled < Surface drillable. Adit access from pit
U.V.X.	Yavapai	+ .05	+2.5	+2.0	A.F. Budge (Mining) Ltd. lease from Verde Expl. Ltd. Some higher grade
Vulture	Maricopa		+2.5	+ .3	A.F. Budge (Mining) Ltd. lease from L. Beal. Fault Extn.??

TAILINGS category

Ash Peak	Greenlee	.03		3.0	
Commonwealth	Cochise	.25	.01	3.3	Presently going to Hidalgo Cu smelter as flux
Cyclopic	Mohave	.05	.06		
Gladstone	Yavapai	.10	.036		
Iron King	Yavapai	5.5	.055	0.7	Sulfide encapsulated. Plus ~ 1% Zn, some As, Pb.
Montana	Santa Cruz	.7		1.0	Under development by K+K Co.
Oatman	Mohave	3.5	.015		Combined district total.
Vulture	Maricopa	.25	.04		A.F. Budge (Mining) Ltd. lease from L. Beal.