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VERBAL INFORMATION SUMMARY

MINE: OLD RELIABLE

DATE: January 29, 1988

ENGINEER: Nyal Niemuth

Don Hausen of Newmont Mining gave a presentation to the Annual SME meeting January 24 - 28, 1988 on the alteration studies of the American Eagle Breccias of the Copper Creek area, Pinal County. (Copper Creek Project - file; Childs Aldwinkle - file; Old Reliable - file; Copper Prince - file; all in Pinal County) The presentation has been briefly summarized below.

This deposit, located in the western slopes of the Galiaro Mountains, has surface showings that consist of spotty high grade deposits such as the Childs Aldwinkle, the Copper Prince, the Copper Giant and Old Reliable, etc. which formed as a result of escaping fluids from the evolving porphyritic magma. Identified by deep drilling and geophysics the 64-68 million year old intrusive is overlain by Galiuro Volcanics. E/NE trending shear zones and N/NW trending dikes and breccia pipes control distribution of the copper mineralization. The porphyry was identified and drilled due to the copper associated with the pipes. They have a resource identified at greater than 2000' deep. Analysis of the cuttings indicate that feldspar lows identified by XRD are good indication of the alteration. The orebody consists of inward trending concentric shells of chalcopryrite, chalcopryrite/bornite, and chalcopryrite/molybdenite. Local geology has resulted in the oxidation depths varying greatly with permeability. Occupying the center of the breccia pipe area, the Childs Aldwinkle deposit contains much molybdenum.

RA

OLD RELIABLE COPPER MINE

Pinal County
Copper Creek Area
Bunker Hill D istr.

KAP WR 1/9/81: Mike Attaway of Ranchers Exploration and Development reported that Ranchers is shutting down the old Reliable Mine, Pinal County, and that the lease will expire on the property and will revert back to Newmont.

NJN WR 7/3/81: Bob Marti of Ranches Exploration and Development Company reported that the Old Reliable mine, Pinal County, was permanently closed May 15, 1981, when the lease from Newmont expired. This is the first time a copper deposit was leached entirely in place.

CJH WR 9/12/86: Phone call: Rita Johnson, Littleton-Long (a law firm?), United Bank Plaza, Tucson, Az. phone 882-4003. Furnished her with legal description and other information regarding the Old Reliable mine, Bunker Hill dsitRICT, Pinal County. Apparently the EPA wants the site cleaned up.

MG WR 2/26/88: **Provided** file infomration on the Reliable mine (Pinal Co) to Mr. Tom Beer of Ecology & Environment, San Francisco. His company is consulting with the Environmental Protection Agency.

OLD RELIABLE COPPER MINE

PINAL COUNTY
Copper Creek Area
BUNKER HILL DIST.

Occidental Int. is still evaluating the results of their work in the Old Reliable Mine and vicinity. GWI Quarterly Report 9/1969

Occidental is still holding on their Old Reliable lease and option. GWI Quarterly Report 4/1/70

Rancher's has announced a plan to produce copper from the Old Reliable Mine in the Copper Creek area. This area is the center of considerable efforts by other large companies to find ore-bodies. (P-D - Humble, ect.) GWI QR 9/71

The big news from the SE part of the county was the big blast at the Old Reliable copper deposit of the Ranchers Exploration and Development Co. GWI QR Jan.-March '72

The Old Reliable is being prepared for production after the big blast. GWI 4 ¼ '72

No information given out regarding the Old Reliable venture. FTJ 4 ¼ '72

T. C. Mr. Hugh Steele, San Manuel, regarding operations within the Copper Creek area. He reports that "Ranchers" have the top 500' of the Old Reliable mine under lease from Newmont for their leaching operation. Newmont is going to move their Arizona Exploration Headquarters from San Manuel to North Tucson (Oro Valley). This within the next couple of months. GWI WR 12/6/72

A field interview was made at the Mammoth office of Ranchers Exploration and Development Co. to acquire "Active Mine" data on their Old Reliable mine operations. REL WR 9/25/73

In Copper Creek, Ranchers were operating their Old Reliable plant (leach). GWI AR 73-74

See: Dept. of Interior, Bureau of Mines, War Minerals Report #275, (Nov. 1942) 12 pages, 4/8/77, a. p.

MG/WR 10/25/79 - Mike Attaway of Ranchers told me that operations at the Old Reliable Mine resumed at the end of September. The leach method is different now; instead of sprinkling acid on top of the blasted ore, the acid is injected through drill holes drilled 300-400 feet down from the surface. Cement copper containing about 80% Cu is produced. The company is looking for a buyer of the cement copper; Magma Copper Co. does not want the product. Ranchers is having trouble keeping the copper concentration up in the pregnant solution. Incidentally, I was told that Newmont leases the top 300-400 feet of the Old Reliable to Ranchers; the lower mineralization comprises part of the Copper Creek deposit publicized by Newmont.

OLD RELIABLE MINE

PINAL COUNTY
BUNKER HILL DIST.

BEAR CREEK MINING COMPANY has taken over, under option to purchase, the OLD RELIABLE and adjoining properties in Pinal County, Arizona, and has also staked about 60 mining claims on the western slopes of the Galiuro Mountains across from San Manuel mine in the same area. The option was acquired from the Siskon Corporation of Reno, Nevada. Geological mapping and some exploration work are in progress, with R. S. McClintock Diamond Drilling Company using two diamond drills in testing the property. The claims are located in the Copper Creek-Sombrero Butte area, scene of much mining activity before and during World War II.

Taken from MINING WORLD, June, 1961, p 50

This property active 10-1961

Regular and extensive pattern diamond drilling has been underway by Kennecott Copper Corporation's exploration subsidiary - BEAR CREEK MINING COMPANY - at and surrounding the OLD RELIABLE copper mine on Copper Creek, Pinal County, Arizona. Copper has been produced for many years at the Old Reliable from a stock like intrusive. So extensive and detailed has been Bear Creek's drilling that independent geologists believe that all possibilities for ore discovery have been checked.

Taken from MINING WORLD, December 1961, p 40

This prop. active Feb. 1962 - Explor. Bear Creek Mining Co., 2601 N. 1st Ave., Tucson, Ariz. Tom Walthier, Mgr.

W
See Mining World 5/1951 - p. 98

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Old Reliable Mine

Date Feb. 16, 1961

District Bunker Hill District, Pinal County

Engineer Axel L. Johnson

Subject: Field Engineers Report. Information from Jackson Clark, Bear Creek Mining Co.

References Report of May 24, 1957.

Mr. Clark informed me that Bear Creek Mining Co. has obtained an option to purchase from the Siskon Corporation, 422 Gazette Bldg., Reno, Nev. He stated that this option may include the Prince, Globe, and other properties adjoining the Old Reliable.

Exploration work on the property is now being done. R. S. McClintock Diamond Drilling Co. is diamond drilling on contract, using 2 diamond drills. Geological mapping of the area is also being done. Mr. Worthington is geologist in charge of the area for Bear Creek Mining Co.

Mine visit to the Old Reliable, not working but optioned to Magma.

GWI WR 4/1/67

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Copper Creek Project by Magma Copper Co.

Date 6-29-67

District Copper Creek or Bunker Hill

Engineer G. W. Irvin

Subject: Mine Visit by Field Engineer

Information from H. Steele of Magma.

The Magma Co. is reported to have optioned most of the Mining property at Copper Creek, including the Old Reliable, Childs Aldwinkle and others.

On a visit March 30th to the area by the Engineer, one drill was operating. this was located south of the Childs Aldwinkle near the top of the ridge.

On the June 29th visit, the Joy driller working in the area reported that they had three drills operating.

Mine visit to Old Reliable mine, watchman says that Magma still has option.

GWI WR 6/30/68

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* BARODYNAMICS, INC. *
* *
* Consulting Services *
* *
* Explosions and Rock Failure *

5810 W. 38th Ave Denver 15, Colo.

THE ADAPTABILITY
OF THE
OLD RELIABLE COPPER MINE
TO IN-SITU LEACHING
BY
CLIFTON W. LIVINGSTON

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* * * * *
* BARODYNAMICS, INC. *
* * * * *
* Consulting Services *
* * * * *
* Explosions and Rock Failure *
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8/30/55

5810 W. 38th Avenue
Denver 14, Colorado
August 30, 1955

Mr. Louis Gaggini
o/o Cohn and Company
1 Wall Street
New York City, New York

Dear Mr. Gaggini:

In accordance with your request of August 23 I submit herewith my report on the applicability of the Old Reliable Copper Mine to in-situ leaching.

I have concluded that a recovery of less than 15 percent of the total copper is probable using the method and that in-situ leaching would be an economic failure.

I believe that the proper procedure for bringing the property into production involves conventional mining, percolation leaching in tanks and perhaps in-situ leaching of the caved oxide capping. To work out the engineering and metallurgical problems which could make possible a profit potential in excess of \$10,000,000 at 30 cent copper and to prepare a report suitable for either government or private financing will require a coordinated engineering-geological-metallurgical program that would take over a year and would cost in the neighborhood of \$100,000.

Such a program might well set the stage for a very substantial operation wherein the tonnage involved is several times larger than the known reserves of the Old Reliable Mine and upon which I estimate a profit potential in excess of \$10,000,000.

Respectfully submitted,

/s/ Clifton W. Livingston, Pres.

Clifton W. Livingston, Pres.
BARODYNAMICS, INC.

COPY/hjl-1/6/57(3) for Shattuck Denn Mining Corporation

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THE PROBLEM

At the request of Mr. Louis Gaggini of Geo-Engineering Company, Grand Junction, Colorado, I visited the Old Reliable Copper Mine accompanied by Mr. Newlove and Mr. P. G. Flumerfeldt to determine if possible the applicability of the orebody to in-situ leaching. I was furnished a copy of Mr. M. J. Elsing's Report of March 22, 1955 and a copy of U. S. B. M. R. I(4006) "The Old Reliable Copper Mine," Pinal County, Arizona, Feb. 1947, By Thomas C. Denton.

THE EVIDENCE

A) The Ore Reserves

As a result of my visit to the property on Aug. 25, 1955, I am of the opinion that the situation as presented in Mr. Dentons publication R. I(4006) properly reflects the condition of the property at the time of my visit.

It was not the purpose of my examination to check or to confirm the estimates of tonnage or grade. I have no reason to believe that the tonnage and grade estimates presented by previous investigators are greatly over estimated. In fact I doubt that either the lateral or the vertical extent of the deposit is known. In some places on the 100-ft. level the lateral limits of the orebody are definitely beyond the limits of the underground development. Although I did not examine the 200-ft. level, I am of the opinion from the distribution of assays that the lateral limits of the orebody on the 200-ft. level have not been reached. Neither do I believe that the orebody stops abruptly below the 200-ft. level. I must conclude therefore that the tonnage potential of the orebody is greater than outlined by existing development work.

B) The Mineralization

It is evident that the orebody consists both of oxide and sulfide minerals. It is evident also that the gradation from oxide to sulfide mineralization is not a sharp line and that the ores above the 100-ft. level consist both of oxide and sulfide copper minerals.

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It is evident also that neither the oxide nor the sulfide minerals are confined solely to fracture planes within the "breccia pipe". Rather, the copper minerals penetrate and permeate the rock mass. Although sulfide copper minerals are present in near-vertical veinlets and the boundaries of the veinlets are oxidized, the veinlets are not in contact with barren rock.

The entire concept of mineralization occurring within a "breccia pipe" has been over-simplified. At least three different types of rock are present in the so-called "breccia pipe". Detailed geologic mapping is necessary to explain the distribution of mineralization and to determine the limits of the orebody on each of the underground levels and on the surface.

The existence of other "breccia pipe" in the area strongly suggests that the several orebodies within property limits of the Flumerfeldt interests are not unrelated to each other structurally, but that the structural relations are unknown at present.

C) The Distribution of Oxide and Sulfide Copper Minerals

Absolute evidence relative to the proportions of oxide and of sulfide copper minerals in the orebody is not immediately available. It is evident from inspection that sulfide minerals are present as far above the 100-ft. level as the backs of the shrinkage stopes.

Observation of concentrates produced at the Old Reliable mill and an analysis of concentrate shipments produced by flotation from ore mined above the 100-ft level relative to reported mill heads indicates that perhaps as much as 50 percent of the copper content may be in the form of sulfides. A typical analysis of concentrates shipped during November 1954 is as follows:

Insol	22.0 Percent
Alumina	5.0 "
Sulfur	23.0
Iron	14.1
Lime	0.4
Copper	<u>33.4</u>
	97.9 Percent
Silver	1.70 oz.
Gold	.007 oz.

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The payment schedule at that date was as follows:

Pay 33.4 pct. less 1.0 = 32.4 pct. at \$0.26395
 Silver at \$0.90/oz. less 0.015 = \$0.885/oz.
 Pay 1.70 - 0.5 = 1.20 oz at \$0.885
 Base charge \$10.25 + 0.24 = \$10.49/ton of concentrate

The iron and sulfur content of the flotation concentrate indicates that both pyrite and chalcocite are being recovered. The relation of the sulfur content to the copper content of the concentrate indicate that the recovery of oxide copper by flotation is low.

D) Permeability and Porosity

The orebody has been silicified and has not been greatly decomposed by surface weathering or by hydrothermal action. As a result, both the porosity and the permeability of the orebody are low. The lack of alteration and the low permeability is further reflected by the comparatively large unsupported spans of the stopes, the selection by the operating staff of shrinkage stoping as a mining method, and the small quantity of timber required in the development headings.

E) The moisture Content of the Orebody and the Position of the Water Table

The stopes, drifts and crosscuts are dry. The water that does enter the mine comes from summer rains. Due to the topography and the position of the streams with respect to the presently developed orebody, it is evident the present water table is well below the 200-ft. level. The complete transition from oxide to sulfide mineralization therefore, may be expected to occur below the bottom of the present workings.

THE REQUIREMENT FOR IN-SITU LEACHING

In order to apply in-situ leaching successfully, the ore minerals must be capable of attack by the solvent with a good extraction of the total copper content of the orebody and without excessive reagent consumption. Excessive quantities of solvent and lack of proper contact between the solvent and the

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ore minerals results in a low content of copper in the pregnant solution and in high costs of precipitation.

Improper boundary conditions result in excessive lateral migration and loss of pregnant solution into the wall rock.

The choice of in-situ leaching over other methods of mining and processing is a matter of economics. With the price of copper at 30 cents per pound, recovery by in-situ leaching should approach 70 percent to be competitive with percolation leaching or combined leaching and flotation wherein recoveries of 90 percent are possible.

APPLICATION OF THE EVIDENCE TO THE PROBLEM

Oxide copper ores can be leached with dilute solutions of sulfuric acid. Sulfide copper ores must be leached with ferric sulfate at elevated temperature. The convert sulfuric acid leach liquors to ferric sulfate requires the production of ferrous sulfate either during the leaching or the precipitation process and subsequent conversion to ferric sulfate using a suitable means of oxidation.

The leaching of sulfide copper minerals with ferric sulfate requires higher temperatures and greater contact time than are required for leaching oxide copper minerals. Neutralization of the ferric sulfate solvent by reaction with the ore results in reconversion to ferrous sulfate and possible development of ferric hydroxide, a colloidal precipitate which reduces the permeability and the percolation rate.

The nature of the Old Reliable orebody (or of any typical "porphyry" copper orebody) with the oxide zone above the sulfide zone requires that the oxide minerals be attacked first if the leaching solutions are introduced at the surface. Thus, the sulfuric acid required for leaching could not be produced in the orebody and would have to be purchased at an approximate base price of \$35.00 per ton in carload lots. The acid cost for leaching based upon Bureau of Mines metallurgical data would be the order of \$1.60 per ton of ore leached. If the sulfide zone could be leached first, the reagent cost

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would be much lower because the orebody would produce both sulfuric acid and ferrous sulfate.

Leaching of the sulfide zone and pumping of unspent solvent to the oxide zone would be impractical because of corrosion.

From the above discussion it follows that in-situ leaching of the Old Reliable orebody must be confined to the oxide ores. Thus the maximum percentage of recoverable total copper at 100 percent extraction of oxide copper is about 50 percent. Because of the low permeability and porosity of the Old Reliable orebody I would expect the recovery of oxide copper to be less than 30 percent. Thus the metallurgical extraction of total copper in the orebody would be less than (30 percent of 50 percent) 15 percent.

It is obvious therefore, that the economics of in-situ leaching as applied to the Old Reliable Mine is unfavorable. It would be unwise to jeopardize the future of the mine in the hope of a quick profit because the overall recovery of copper could be much lower than 15 percent. Once leaching had begun and the extraction found to be poor, it would be too late to switch to some other method after the orebody was saturated with acid.

CONCLUSIONS

Because of the following factors I am of the opinion that in-situ leaching leaching of the Old Reliable orebody in its present condition would be an economic failure.

- 1) The proportions of oxide to sulfide are about 1 to 1
- 2) Different solvents are required for oxide and for sulfide copper minerals
- 3) The copper minerals are present both filling vertical veinlets within the orebody and are disseminated through the rock mass.
- 4) The porosity and permeability of the rock mass are both low thus preventing effective contact of the minerals disseminated in the rock mass with the solvent.

I am of the opinion that using some variation of perco-

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lation leaching in tanks, that a metallurgical extraction in excess of 90 percent is possible and that the ore body is capable of yielding a profit in excess of \$5.00 per ton with copper at 30 cents per pound. In order to achieve the indicated extraction, metallurgical test work on two types of flow sheets as follows are desirable:

- 1) Percolation leaching of combined oxide and sulfide ores blended in the proper proportions using a sulfuric acid-ferric sulfate or a sulfuric acid-manganese dioxide solvent
- 2) Various combinations of leaching and flotation.

In order to achieve an indicated profit in the order of \$5.00 per ton at 30 cents copper not only is it essential that the method of processing be properly chosen, but it is also necessary to properly select the most economical mining method and properly to appraise the ore reserve potential not only of the Old Reliable Mine but of the adjacent "breccia pipes". In my opinion neither the total tonnage of the Old Reliable orebody or the ore reserve potentials of other "breccia Pipes" present on the Flumberfeldt holdings are known. To achieve a ten million dollar profit potential requires a coordinated engineering-geological-exploration program designed to dovetail into the metallurgical studies.

Such a program would entail engineering and development expenditures of perhaps \$100,000 dollars to prepare the property for development and proper financing for a mill which in my opinion should have a capacity in excess of 1000 tons per day.

Respectfully Submitted,

/s/ Clifton W. Livingston

Clifton W. Livingston, Pres.
BARODYNAMICS, INC.

(S E A L)

COPY/hj1-1/7/57(3) Shattuck Denn Mining Corporation

*GENERAL REFERENCES

- REFERENCE 1 F1 < ABGMT-USGM RE DATA
- REFERENCE 2 F2 < KUHN, T.H., 1941 PIPEDEPOSITS OF THE COPPER CREEK AREA, ARIZONA. ECON GEOLOGY V 36 p 512
- REFERENCE 3 F3 < SIMONS, F.S., 1964. USGS PP 461, P 158-168.
- REFERENCE 4 F4 <

D10 < ABGMT-USGM PRODUCTION MAY INCLUDE COPPER PRINCE, GLORY HOLE, AND SUPERIOR PROSPECTS AS WELL AS ~~THE~~ MINE DESCRIBED HERE >

maps 547B

ACS DIGEST 11 ECON GEOLOGY 36 512

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

*RECORD NUMBER B10 < _____ > *RECORD TYPE B20 < X, I, M > DEPOSIT NUMBER B40 < _____ >
 *REPORT DATE G1 < 8, 2, 0, 3 > *INFORMATION SOURCE B30 < 1, 2, _____ > *FILE LINK IDENT. B50 < W207-004017 >
YR. MO.
 *REPORTER (SUPERVISOR) G2 < GERT, DON E > (last, first, middle initial)
 *REPORTER AFFILIATION G5 < ABGMT > *SITE NAME A10 < CLARK MINE >
 *SYNONYMS A11 < CLARK-SCANLON, RELIABLE * >

LOCATION

*MINING DISTRICT/AREA A30 < BUNKER HILL >
 *COUNTY A60 < PINAL > *STATE A50 < AZ > *COUNTRY A40 < U, S >
 *PHYSIOGRAPHIC PROV A63 < 1, 2, 3 >
 *DRAINAGE AREA A62 < 1, 5, 0, 5, 0, 2, 0, 3, 1, 1, LOWER COLORADO >
 *QUADRANGLE NAME A90 < OAK GROVE CANYON (1, 1, 9, 7, 2) > *LAND STATUS A64 < 4, 9, 8, 0, 1, 1, 1, 1, 9, 7, 9 >
 *SECOND QUAD NAME A92 < _____ > *QUADRANGLE SCALE A100 < 2, 4, 0, 0, 0, _____ >
 *ELEVATION A107 < 4, 1, 0, 0, 1, 1, F, T > *SECOND QUAD SCALE A91 < _____ >

UTM *ACCURACY *GEODETC
 *NORTHING A120 < 3, 6, 2, 4, 2, 3, 0 > ACCURATE ACC (circle) *LATITUDE A70 < _____ N >
 *EASTING A130 < 5, 4, 8, 2, 0, 0 > ESTIMATED EST *LONGITUDE A80 < _____ W >
 *ZONE NUMBER A110 < 1, 1, 2 >

CADASTRAL
 *TOWNSHIP(S) A77 < 0, 0, 8, 5, _____ > *RANGE(S) A78 < 0, 1, 8, S, _____ >
 *SECTION(S) A79 < 10 _____ >
 *SECTION FRACTION(S) A76 < N _____ >
 *MERIDIAN(S) A81 < GILA AND SALT RIVER >

*POSITION FROM NEAREST PROMINENT LOCALITY A82 < 100 YARDS S OF COPPER PRINCE MINE >
 *LOCATION COMMENTS A83 < UTM IS ESTIMATED, N 1/2 SECTION 10 IS ALL KNOWN ABOUT THIS LOCATION >

Y

COMMODITY INFORMATION

COMMODITIES PRESENT C10 < C, U, A, G, A, U, P, B, ... >
ORE MINERALS C30 < CHALCO PITE >
COMMODITY SUBTYPES C41 < >
GEN. ANALYTICAL DATA C43 < >
COM. INFO. COMMENTS C50 < ONLY CU AND AG PRODUCED 1905 TO 1930 >

SIGNIFICANCE

MAJOR PRODUCTS MAJOR < C, U, A, G, ... >
MINOR PRODUCTS MINOR < A, U, P, B, ... >
POTENTIAL PRODUCTS POTEN < >
OCCURRENCES OCCUR < >

*PRODUCTION

PRODUCTION YES (circle) PRODUCTION SIZE SMD MED LGE (circle one)
NON-PRODUCER PRODUCTION UND NO (circle one)

EXPLORATION OR DEVELOPMENT

STATUS PRODUCER STATUS AND ACTIVITY A20 < 4 >
NON-PRODUCER STATUS AND ACTIVITY A20 < >

DISCOVERER L20 < >
YEAR OF DISCOVERY L10 < > NATURE OF DISCOVERY L30 < B >
PRESENT/LAST OWNER A12 < >
PRESENT/LAST OPERATOR A13 < A.C. CLARK, 1934 >
EXPL./DEV.COMMENTS L110 < >

DESCRIPTION OF DEPOSIT

DEPOSIT TYPE(S) C40 < VEIN / BRECCIA PIPE >
DEPOSIT FORM/SHAPE M10 < >
DEPTH TO TOP M20 < > UNITS M21 < > MAXIMUM LENGTH M40 < > UNITS M41 < >
DEPTH TO BOTTOM M30 < > UNITS M31 < > MAXIMUM WIDTH M50 < > UNITS M51 < >
DEPOSIT SIZE M15 < SMALL > M16 < MEDIUM > M17 < LARGE > (circle one) MAXIMUM THICKNESS M60 < > UNITS M61 < >
STRIKE M70 < > DIP M80 < >
DIRECTION OF PLUNGE M100 < > PLUNGE M90 < >
DEP. DESC. COMMENTS M110 < >

DESCRIPTION OF WORKINGS

Workings are: SURFACE M120 UNDERGROUND M130 BOTH M140 (circle one)
DEPTH BELOW SURFACE M160 < > UNITS M161 < > OVERALL LENGTH M190 < > UNITS M191 < >
LENGTH OF WORKINGS M170 < > UNITS M171 < > OVERALL WIDTH M200 < > UNITS M201 < >
DESC. OF WORK. COM. M220 < > OVERALL AREA M210 < > UNITS M211 < >

GEOLOGY

AGE OF HOST ROCK(S) K1 < CRET. ... 68 MY (CREASEY AND KUTLER, 1962) >
HOST ROCK TYPE(S) K1A < COPPER CREEK GRANODIORITE, PYRITIC HORNFELS >
AGE OF IGNEOUS ROCK(S) K2 < CRET. ... >
IGNEOUS ROCK TYPE(S) K2A < GRANODIORITE, HORNFELS (DERIVED FROM ANDESITE) >
AGE OF MINERALIZATION K3 < L.C.R.E.T. - T.E.R.T.B. >
PERT. MINERALS (NOT ORE) K4 < QUARTZ, SERICITE >
ORE CONTROL/LOCUS K5 < >
MAJ. REG. TRENDS/STRUCT. N5 < >
TECTONIC SETTING N15 < >
SIGNIFICANT LOCAL STRUCT. N70 < >
SIGNIFICANT ALTERATION N75 < >
PROCESS OF CONC./ENRICH. N80 < >
FORMATION AGE N30 < CRET. ... >
FORMATION NAME N30A < COPPER CREEK GRANODIORITE >
SECOND FM AGE N35 < CRET. ... >
SECOND FM NAME N35A < GLORY HOLE VOLCANICS (HORNFELS FROM ANDESITE) >
IGNEOUS UNIT AGE N50 < >
IGNEOUS UNIT NAME N50A < >
SECOND IG. UNIT AGE N55 < >
SECOND IG. UNIT NAME N55A < >
GEOLOGY COMMENTS N85 < LITTLE KNOWN ABOUT THIS MINE EXCEPT ITS PROXIMITY TO THE OLD RELIABLE, AND ITS PRODUCTION. THE HOIT MAY BE ONE IN GLORY HOLE PYRITIC HORNFELS DESCRIBED BY SIMONS, 1964, P 167. >

GENERAL COMMENTS

GENERAL COMMENTS GEN < >

Reno, Nevada
August 1, 1964
File 4-1891

OLD RELIABLE, PRINCE & GLOBE COPPER MINES
BUNKER HILL MINING DISTRICT
COPPER CREEK, PINAL COUNTY
STATE OF ARIZONA

Siskon owns the Old Reliable group of 20 patented and 40 unpatented lode mining claims, situated in the Copper Creek area of the Bunker Hill mining district, Pinal County, Arizona, located in a direct line about 12 miles northeasterly of the San Manuel copper mine, controlled by Magma Copper Co. The U. S. Government is credited with having advanced in excess of \$90 million to finance the San Manuel copper mine, which is being mined at the rate of plus 30,000 tpd through vertical shafts 2,500' in depth, from underground workings. The ore heads are reported to average around 0.75 to 0.80% Cu and 0.02 to 0.04% Mo, according to statements issued by San Manuel Copper Corporation.

Siskon purchased the Old Reliable group of claims from Mr. L. W. Douglas, the Chairman of the Board of Directors of Southern Arizona Bank and Trust Co., one of the large banks of Arizona. Mr. Douglas is a mining engineer and was formerly the U. S. Ambassador to Great Britain. He is the son of Mr. Jimmy Douglas, the mining operator who made such an outstanding record by the successful production of high grade copper ore from the United Verde Extension mine at Jerome, Arizona. Associated with Mr. L. W. Douglas in the corporation which owned and operated the Old Reliable group of claims, were Mr. Ira B. Joralemon and Mr. Morris J. Elsing, each being rated as outstanding mining engineers.

Siskon purchased the Old Reliable when copper was selling above 40 cents per lb. in 1955-6, and Siskon has in excess of \$200,000 invested in the Old Reliable venture. Siskon owns (without indebtedness) the Old Reliable group, upon which there is a camp and 100 to 150 ton flotation mill. A power line supplies electricity to the mill and mine. After purchasing the Old Reliable from Mr. Douglas (title held by Copper Creek Consolidated, controlled by Mr. Douglas), Siskon, acting under recommendations made by reputable mining engineers, endeavored to leach in place the top part of the Old Reliable oxidized ore zone (assaying less than 1% copper) and after pumping water into fifty some odd drill holes lined with 2" pipe for in excess of four weeks, the water finally broke through on No. 1 level (main), and the first water solution assays averaged better than two percent copper. Siskon and Chessher were jubilant; however, the state of jubilancy was brief because in a couple of days the solution channels became plugged up, and thereafter Siskon experienced no further break-throughs of water into any of the old adits, cross-cuts, stopes, and/or raises. Finally, in disgust and with disappointment the project was abandoned.

Siskon believes that the ore on the three properties which it proposes to operate under one milling unit (the three properties being the Old Reliable, Prince, and Globe and are within one-half mile of each other) are all three amenable to

... mining with power shovels in open pit upon an estimated ratio of less than five waste to one ore. Siskon does not own the Prince and Globe. They are a part of the Phelps Dodge Corporation's patented properties, which are shown on the large claim map submitted herewith. Phelps Dodge has executed a seven year lease, dated November 1, 1963, to Siskon on its Globe and Prince ore bodies which, according to reports at hand, were developed by the Calumet and Arizona Copper Co. The Siskon seven year lease provides for the following royalties, to wit:

<u>Ores Monthly Average</u>	<u>Royalty % Net Smelter</u>
Less than 1.5% Cu	5.0% net smelter - less trucking
1.5% to 1.99% Cu	6.5% " " " "
2.0% to 2.49% Cu	7.5% " " " "
2.5% to 2.99% Cu	10.0% " " " "
3.0% to 3.99% Cu	15.0% " " " "

and the Prince and Globe ore bodies represent two distinct and separate ore zones, the copper content of which is valued at in excess of \$6 million gross at current price of copper. The minimum royalty payment, under aforesaid lease, is \$500 per month, however, there are no work requirements or minimum tonnages to be met. There is a provision which requires that the seven year lease only applies to ore above the 500' level and that none of the ore zones shall be leached in place.

Siskon, as above stated, believes that the three ore bodies (Old Reliable, Prince, and Globe) are amenable to mining in open pit with power shovels at an estimated ratio of less than five waste to one ore, providing the average of the ore bands are accepted at 1.68% copper. Siskon believes that there are available for power shovel (open pit) operations, a total of 1,348,000 tons of ore reserves amenable to open pit mining, which, according to estimated calculations, average 1.68% copper; said 1,348,000 tons being represented by three separate blocks of ore described as follows, to wit:

GROSS VALUE AT 30¢ PER LB. FOR COPPER CONTENT
(Estimated Ore Reserves)

Prince	272,000 tons @ 2.40% Cu	\$3,916,800
Globe	236,000 tons @ 1.37% Cu	2,647,920
*Old Reliable	840,000 tons @ 1.40% Cu	7,056,000
Total Value of 1,348,000 tons @ 1.68% Cu		\$13,620,720

*Morris J. Elsing reports 329,500 tons in Old Reliable averaging 2.45% Cu, which ore is included in the 840,000 tons.

The total cost of a plant capable of milling and processing 1200 tpd is estimated to be \$2,000,000 providing judicious buying is exercised and good used equipment is acquired for a part of the mill. A 1200 tpd L.P.F. processing and milling plant should recover (based on extensive metallurgical test work by Mr. J. A. McAllister, Arizona Representative for American Cyanamid Co.) around 93% to 95% of the copper in the ore in the leaching, precipitating, and flotation plant, and it is believed that when copper is selling at 32¢ we should receive, from the smelter, under a negotiated contract, credit for at least 30¢ per lb., before deduction of smelter charges, for the copper in the proposed 30% to 40% copper flotation concentrates. In our calculations, hereinafter contained, we have used a figure of 29¢ per pound of copper to be allowed by smelter for concentrates before deduction of smelter charges from the smelter settlement sheet.

Siskon believes that if the operator will select and mine in the three mines (Old Reliable, Prince, and Globe) the ore reserves of 800,000 tons of 2.25% Cu ore to be treated in a \$1,000,000 mill with a capacity of 600 tpd (200,000 tpy), with a recovery of 90% and an average royalty of two-thirds of 7½%, such might be more profitable by in excess of \$500,000 within four years time than if the operator designates an ore body of 1,348,000 of an estimated grade of 1.68% Cu ore to be mined in open pits with power shovels and to be treated in a \$2,000,000 mill with a capacity of 1,200 tpd (400,000 tpy), with a recovery of 90% and an average royalty of two-thirds of 6½%. The main factor, confronting Siskon or any operator, is to establish whether or not the ore can be mined from tunnel levels and delivered into the primary ore bin at a cost of \$2.50 per ton at the rate of 800 to 1,000 tpd for five days per working week. The comparison is set up hereinafter in separate schedules.

A recapitulation and comparison of the respective returns from the aforesaid 600 tpd (underground) and 1,200 tpd (open pit) operations, as estimated by Siskon, are as follow:

MINING & MILLING 600 TPD FROM 800,000 TONS
EST. 2.25% COPPER ORE DURING 4 YEARS
(Underground)

Gross profit from 800,000 tons of 2.25% Cu ore at smelter 29¢ per pound less 10% tailing loss and less 2/3 of 7½% royalty and less \$6.50 per ton est. mining and milling cost	\$3,726,000
Total mill depreciation 800,000 tons @ \$1.25/ton less 10%	900,000
Total depletion 15% of 800,000 tons @ \$11.1575	1,338,900
Net operating income before taxes	1,487,100
Salvage value of mill after \$900,000 depreciation	100,000
Depreciation & depletion - \$2,238,900 less \$900,000 mill depreciation	1,338,900
Total profit \$1,487,100 (subject taxes) and \$1,338,900 depletion	2,826,000

MINING & MILLING 1200 TPD FROM 1,348,000 TONS
EST. 1.68% CU ORE DURING 3½ YEARS
(Open Pits - Power Shovels)

Gross income from 1,348,000 tons 1.68% Cu ore at smelter price 29¢ per pound less 2/3 of 6½% royalty and less 10% tailing loss and less \$5.95 est. mining & milling cost	\$3,289,120
Total mill depreciation 1,348,000 tons @ \$1.50 less 10%	1,800,000
*Total depletion - 15% of 1,348,000 tons @ \$8.39	1,696,458
*Above \$1,696,458 depletion limited to 50% of net income \$1,489,120	744,560
Net operating income before taxes	1,489,120
Salvage value of mill after \$1,800,000 depreciation	200,000
Depreciation \$1,800,000 + depletion \$744,560 less mill depreciation	744,560
Total profit \$1,489,120 (subject taxes) and \$744,560 depletion	2,233,680

Under the two schedules above cited, the tax free profit from depletion is not subject to taxes, however, the \$1,487,100 and \$1,489,120 net operating incomes are subject to income taxes unless they are expended for development and exploration expenses and costs, etc. The important and major targets at which the Old Reliable, Prince, and Globe mining and milling project is to be directed consist of any one or all of the plans described in Targets Nos. 1, 2, and 3 as are hereinafter described.

The comparison hereinabove made between mining 800,000 tons of 2.25% Cu ore underground at the rate of 800 to 1,000 tpd for five working days per week versus mining 1,348,000 tons of 1.68% Cu ore in open pits with power shovels at the rate of 1,600 to 2,000 tpd, indicates to Siskon, as above stated, that it will be more profitable to mine 800,000 tons from underground PROVIDING the overall underground mining cost can be maintained at a maximum of \$2.50 per ton upon a schedule of 800 to 1,000 tpd during a five day mining work week.

The ore reserves available underground, according to reports by prominent mining engineers, have been broken down, described, and evaluated as follows:

ESTIMATED ORE RESERVES

<u>MINE</u>	<u>ORE ZONES</u>	<u>SIZE</u>	<u>EST. TONS</u>	<u>% CU</u>
<u>PRINCE</u>	Shaft Chimney			
"	1st Level	120'x225'x100'	180,000	2.64
"	2nd Level	60'x230'x100'	92,000	2.64
"	3rd Level	40'x 85'x 50'	11,000	2.15
"	East Chimney			
"	200' Level	65'x 90'x100'	39,000	2.57

The above estimated Prince ore reserves, after deducting 50,000 tons for prior mining, represents an estimated 272,000 tons of 2.40% Cu ore, and at a 30¢ copper price the estimated gross value of Prince ore reserves is \$3,916,800.00

<u>GLOBE</u>	Main Shaft			
"	1st Level	60'x 90'x100'	36,000	3.15
"	2nd Level	60'x150'x100'	50,000	1.44
"	Southeast Chimney			
"	250' Level	100'x175'x100'	128,000	1.67
"	South Chimney			
"	250' Level	60'x 55'x100'	22,000	1.98

The above estimated Globe ore reserves represent an estimated 336,000 tons of 1.87% Cu ore, and at a 30¢ copper price the estimated gross value of Globe ore reserves is \$2,647,920.00

*OLD RELIABLE - above 200' (second tunnel) Level
(No dimensions given) 840,000 1.4%

The above estimated Old Reliable ore reserves represent 840,000 tons of 1.4% Cu ore, and at a 30¢ copper price the estimated gross value of Old Reliable ore reserves is \$7,056,000.00

*Morris J. Elsing reports 329,500 tons of ore averaging 2.45% Cu, which are included in the 840,000 tons.

A recapitulation of the values of the estimated ore reserves in each of the above described copper properties, appears as follows, to wit:

R E C A P I T U L A T I O N

PRINCE estimated value of ore reserves	\$ 3,916,800.00
GLOBE estimated value of ore reserves	2,647,920.00
OLD RELIABLE estimated value of ore reserves	<u>7,056,000.00</u>
 TOTAL ESTIMATED VALUE OF ORE RESERVES	 \$13,620,720.00

Please bear in mind that the estimated 840,000 tons of 1.4%, as taken from Mr. Joralemon's Old Reliable report of November 2, 1951, represents the area in which a large tonnage of copper ore (329,500 tons of 2.45% Cu) assaying more than 2% Cu is evidenced by the report on Old Reliable Copper Mine as made by Mr. Morris J. Elsing, an eminent engineer and geologist. The Elsing report is dated November, 1951, and contains a calculation of copper ore above the Old Reliable 100' and 200' levels as follows:

Net tons above the 100' level averaging 2.6% Cu	105,500 tons
Net tons 100' (No. 1 Tunnel) to 200' (No. 2 Tunnel) level averaging 2.4% Cu	224,000 tons

The Joralemon report, evidencing 840,000 tons of 1.4% Cu ore in the Old Reliable, if broken down to conform to Mr. Elsing's estimate, would, in Siskon's calculations, be necessarily changed and weighted to read as follows:

105,500 tons x 2.6%	Cu =	274,300 units of Cu
224,000 tons x 2.4%	Cu =	537,600 units of Cu
<u>510,500 tons x 0.713%</u>	Cu =	<u>364,100 units of Cu</u>
 840,000 tons x 1.4%	Cu =	 1,176,000 units of Cu

$$\frac{1,176,000}{840,000} = 1.40 \text{ units of Cu per ton.}$$

In Mr. Joralemon's report on Old Reliable copper mine, bearing date of November 2, 1951, he made the following statement:

"An added advantage of building a mill at the Old Reliable would come from the fact that the operators would be in an excellent position to take a lease on the adjoining Phelps Dodge property, which has developed nearly 400,000 tons of 2.67% copper ore. The Old Reliable and the adjoining Phelps Dodge properties together contain about 35,000,000 lbs. of copper recoverable by flotation."

and the estimates on pages 1 and 2 hereinabove set forth substantially coincide, in our opinion, with Mr. Joralemon's estimate directly quoted above wherein he stated that there was above 35,000,000 pounds of copper recoverable by flotation from the ore reserves in the Old Reliable and Phelps Dodge properties (Prince and Globe).

Any of the following Targets 1, 2, and 3 could be the means of converting Siskon, as the operator, into a major mining company providing Siskon expends most of the net income for exploration and development costs and expenses by seeking huge copper ore zones in areas designated hereinafter as Targets Nos. 1,

2, and 3, which are described as follows, to wit:

Target No. 1. The area on the 12 claims owned by Siskon, upon which Kennecott (Bear Creek) drilled two holes, Nos. 1 and 2, and it penetrated a zone of copper ore assaying 0.435% Cu for 600' in thickness and also drilled through 180' of molybdenite assaying 0.178% Mo and 1.13% Cu.

Target No. 2. This area is described as being on the Veta Rica and Grandview claims and is referred to as the Jakosky area as his report covers a geophysical survey made in 1931 on Siskon's claims then owned by Copper State Metals Co.

Target No. 3. Siskon's property surrounds the Childs-Aldwinkle group of eight claims on three sides (east, west, and south). Phelps Dodge's group adjoins the northern boundary of the Childs-Aldwinkle group. Mr. Carl Trischka, former Chief Geologist for Phelps Dodge, made a report in 1935 in which he made the following statement, to wit:

"The main orebody is in the form of a chimney which dips at about 70° and is in cross section 225 feet long by 35 to 40 feet in width and the ore is developed for approximately 300 feet below the outcrop. The tonnage is estimated at 200,000 tons and at the present rate of production has a life of about four years without going beyond the 35 foot winze which has been sunk from the lowest tunnel, or considering the new orebody which is being developed at present within 40 feet of the present one. The ore in the winze appears to have the same strength and quality as that above. The grade of the ore is somewhere between 1.50 and 1.75% molybdenum with 0.8% copper and no gold or silver. Some of the ore which is being milled comes from the new orebody which is only slightly developed and is as yet of unknown size, but the grade thus far has been lower than that of the original orebody which in turn is not of uniform grade throughout as there are lateral zones, 30 - 50 feet thick, which are richer in grade than those between."

Siskon believes that the Childs-Aldwinkle vein or ledge is a faulted segment for which will be found an extension of the main vein or ledge upon Siskon's adjoining ground; the ledge or vein to be covered by detritus and/or alluvium. Recently, Siskon's caretaker at the Old Reliable picked up in the bed of Copper Creek a chunk of ore weighing between 20 and 30 lbs., which apparently had not travelled very far. An assay impartially made indicates the ore contains plus 40% copper and plus 6% Molybdenum. Siskon proposes to use geophysical methods to locate the main segment of ore vein or ledge from which the Childs-Aldwinkle segment of 200' x 35' x 300' deep originated.

The plus billion dollar (\$1,000,000,000.00+) Old Reliable copper target at which Siskon is directing its aims and ambitions, and upon which it may expend any net income earned

from the proposed operations described in this report; said net income being subject to income tax liability; the expenditures to be for exploration and/or development expenses as authorized by Section 615 of IRC, is shown as a mineralized ore zone in red color on the enclosed claim map, which map portrays the mining claims owned by Phelps Dodge, Bear Creek (Kennecott), and Siskon in the Copper Creek area, Pinal County, Arizona.

Siskon believes that the minimum depth to be penetrated has been plainly demonstrated and established in Kennecott's (Bear Creek's) Drill Holes Nos. 1 and 2, wherein the mineralized copper ore zone of 490' of 0.477% copper ore was not encountered in Hole No. 1 until the drill reached a vertical depth of about 1,660 feet, and in Hole No. 2 the drill reached a vertical depth of about 1,316 feet (1,520' on a 60° dip) before 180 feet thickness of ore averaging 1.13% Cu and 0.178% Mo was encountered.

In the mining and milling of the ore reserves in the Old Reliable, Prince, and Globe ore zones, as above described, Siskon believes it is advisable for the mine operator to mine the 2% to 2½% copper ore underground by "block caving", "cut and fill", "room and pillar", and/or "top-slicing" methods or practices, or by a modified method improvised by the operator. Milling operations should be at the rate of plus 600 tpd and the grade of ore should be maintained between 2% and 2.5% copper. The underground workings are available and ready, with a small amount of repairs and cleanups, to start mining operations.

The question of a source of a constant water supply should be assured because it is doubtful if present water in the shafts at Copper Creek will supply 100 gpm. Siskon owns 160 acres of land near the San Pedro River at Mammoth which Siskon purchased for a mill site and water supply at \$100 per acre in order to be assured of a constant water supply contemplated and planned from the drilling of shallow wells into the sand reservoir fed by water percolating and capillarity from the water flows of the San Pedro River. Water might be developed in the valley between Copper Creek and the San Pedro River; the river being less than twelve miles from the Old Reliable property. There are two major power lines passing across Siskon's 160 acres of land near Mammoth, Arizona; therefore, a sufficient electric power supply is assured. Arizona Public Service Company has a power line supplying electric power at the Old Reliable copper property and for supplying power to other properties in the district.

If the mine operator should decide to mine underground at the rate of 800 to 1,000+ tpd for five days per week, we believe the actual mining and milling costs might be as follows, to wit:

Mining	\$2.50	per ton
Milling	2.00	" "
Marketing	0.50	" "
Overhead	0.50	" "
Reserve	<u>1.00</u>	" "

TOTAL \$6.50 per ton

... If the best parts of copper ore zones, assaying 2% or more in copper, are mined, it is believed that the average head value can be maintained at 2.25% Cu. We rely upon reports in hand for our evaluations. It is believed that by leaching, precipitation, and flotation the recovery by concentrate will be closer to 95% than to 90%; nevertheless, we are only using 90% in the calculations made in the document attached hereto.

Siskon believes that it can, in "poor boy" fashion, construct a combined leaching, precipitating, and flotation plant, capable of processing 600 tpd, at a capital cost of \$1,000,000, as hereinabove referred to. Siskon recalls that when it commenced construction of its 300 tpd cyanide plant in a wild and uninhabited part of Siskiyou County, California, in 1952, it was estimated by others that a 300 tpd CCD gold cyanide plant would cost, in such an out-of-the-way place, the sum of \$750,000; however, Siskon by the use of close buying, good supervision, and management, by purchase of good used equipment, and by refusing to contract the work at prevailing high prices, was able to erect the 300 tpd gold cyanide mill for less than \$400,000 and therein Siskon milled its ore from which in excess of \$3.5 million in gold-silver bullion was produced and all thereof was sold to the U. S. Mint in San Francisco. The mill is still intact and held ready for resumption if gold price is substantially increased.

We believe that on a special contract the smelter, when market posted price for copper is 32¢ per lb., will pay us 29¢ per lb. for our copper content. As hereinabove itemized, we have set up a charge of \$0.50 per ton of crude ore for marketing and \$1.00 per ton of crude ore for a reserve, the \$1.00 per ton of crude ore milled being for miscalculations, unforeseen contingencies, and errors in estimates, etc. If it takes at least 18 tons of crude ore to make one ton of flotation concentrates assaying 30% to 40% Cu, then we will have created a fund from said 50¢ and said \$1.00 which Siskon believes will more than cover the smelter's estimated charges.

Siskon reiterates and presents the details of its estimated calculations, and the salient points to be observed, in the citations as follows, to wit:

- (a) Siskon estimates a combined 800,000 tons of 2.25% copper ore in the Old Reliable, Prince, and Globe copper properties, using Joramemon and Elsing reports as its basis.
- (b) Siskon estimates a milling plant cost of \$1,000,000+, for a 600 tpd operation, the ore to be from an underground operation, and Siskon proposes to refund the cost of said milling plant by depreciating on a unit basis at the rate of \$1.25 per ton of crude ore mined and milled. At 600 tons per day (200,000 tpy) Siskon's estimated annual depreciation allowance will be (200,000 tons/year at \$1.25) \$250,000.
- (c) Siskon's estimated net income of \$1,487,100 for four years from the operations outlined in the preceding two subparagraphs (a) and (b) should be expended for deep drilling, exploration, and/or development costs in order to legally avoid income taxes, and, also, in order to create a growth

corporation with huge ore reserves and nontaxable ore reserves not blocked out or measurable. In such event, it is believed the Tax Assessor will have no basis for assessment of ore reserves for taxation purposes.

The detailed and estimated information contained hereinabove, presents Siskon's estimated and preferred conception of what might be accomplished at Old Reliable by mining 800,000 tons of 2.25% Cu ore in four years by milling 600 tpd in a L.P.F. mill.

Respectfully presented,

SISKON CORPORATION



H. B. Chesster, President
320 W. Liberty Street
P. O. Box 889
Reno, Nevada

Enclosures

Maxie Anderson (left), John Motica

Report to Shareholders

Nineteen-eighty-one was a year in which the Company made excellent progress in becoming a significant producer of precious metals. This effort, which is going relatively smoothly despite very erratic metal prices, will be largely completed early in the current fiscal year when the Escalante silver mine comes on stream. Further drilling during the year at the Revenue-Virginus Mine should also determine whether the Company has a second major reserve of silver.

Lower metal futures profits and uranium royalties, greater exploration expense, and generally higher operational costs as the result of inflation combined to reduce earnings to \$1.27 per share from \$1.63 in 1980. Revenues remained about the same — \$32,913,320 vs. \$32,561,623 a year ago. Earnings would have been lower except that the Company continued to benefit significantly from contracts for delivery of uranium concentrates at prices well above those presently prevailing and from high-priced silver futures positions closed out when the market declined in 1981. The Company also sold about a third of its copper production at \$1 per pound, helping to cushion Bluebird Mine operations when prices subsequently fell to approximately \$.75 per pound.

The sale of uranium concentrates from the Johnny M Mine under long term contracts to Gulf States Utilities and Taiwan Power Company proved exceptionally fortuitous. At a time when many mining companies were closing mines and showing large losses on uranium operations, the Johnny M continued to run smoothly, producing a pre-tax profit of \$2,327,367 for the Company's account. The mine will probably close late in the current fiscal year, but sales commitments through 1984 will continue to be filled either from inventories or purchased concentrates. These favorable contracts, which can be satisfied through delivery of uranium purchased at the much lower prices prevailing today, should continue to be highly profitable for the Company through 1984.

The Company realized pre-tax profits of \$2,232,807 from closeout of silver futures positions taken when sil-



ver prices rose in 1980. Unrealized pre-tax profits of about \$500,000 also have been carried forward into the current fiscal year. The Company has obtained substantial lines of credit to permit it to make forward sales of silver production when prices increase, as management anticipates.

The Company showed a pre-tax gain of \$859,575 at its Bluebird copper mine during the year, but this was largely the result of reduced operating costs which stemmed from a decision to halt the stripping of overburden from the deposit. Given present copper prices and those expected in the foreseeable future, the Company feels that it is no longer practical to remove overburden required to mine the ore from the open pit. Instead, the Company proposes to fracture and leach the ore in place and pump recovered solutions to the existing solvent extraction-electrowinning plant for treatment as in the past. This change is now under study, and management is cautiously optimistic, given past leaching experience, that it can be effected economically. Production from present leaching heaps would continue throughout the remainder of the current fiscal year; production from the new system would likely not commence in volume until 1983 or 1984.

The Company completed recovery of leaching solutions from the Old Reliable Mine during 1980 and closed this small copper operation. The Hope Mine, a small uranium producer, was also closed during the fiscal year when it became uneconomical to mine the remaining geologic reserves.

Copper

Copper production increased in 1981 at the Company's principal producer, the Bluebird Mine, where output totaled 13,598,470 pounds of cathodes, compared to 12,189,249 pounds in 1980. Other production during 1981 came from the Old Reliable Mine, an in-place leaching operation which was closed early in the year after production of 424,603 pounds of cement copper. The mine produced 1,850,057 pounds last year.

The Bluebird Mine, located near Miami, Arizona, is a leaching operation where low grade oxide copper ore is mined from an open pit. The ore is hauled to heaps where sulfuric acid is applied to dissolve the copper, producing a copper-bearing solution which is treated by solvent extraction-electrowinning to produce copper cathodes. Because of an increasing ratio of overburden to ore and continuing low copper prices, which averaged \$.91 per pound vs. \$.94 a year ago, a decision was made in December 1980 to halt stripping of overburden from the deposit. Mining of ore was terminated in July 1981, and construction of leaching heaps ceased. Some 2.8 million tons of ore and 2.3 million tons of waste were mined during the year, compared to 4.1 million tons of ore and 3.9 million tons of waste in 1980.

Production is expected to continue throughout much of the present fiscal year from heaps constructed before mining was terminated. For the future, the Company is considering an in-place leaching approach in which ore remaining in the deposit would be broken by hydraulic fracturing, leached with sulfuric acid, and the copper-bearing liquid collected in boreholes and pumped to the present solvent extraction-electrowinning plant for cathode production.

The deposit still contains an estimated 65 million tons of ore averaging .53 percent copper; the Company feels that by using its extensive experience in copper leaching a system can be devised which could lead to recovery of a worthwhile portion of this reserve. A pilot operation would be required, and volume production would probably not occur before 1983 or 1984. The project would draw on leaching experience at the Bluebird, as well as knowledge gained from the in-place leaching operations at the Old Reliable and Big Mike mines.

The Bluebird was placed in operation in 1963, and has since produced about 48 million tons of ore and 200 million pounds of copper. The mine was the first to leach copper oxide ore on a large scale and the first to produce cathodes on a commercial basis by solvent extraction-electrowinning.



Cathode Copper

Management Discussion & Analysis

Operations

The Company's net income for the fiscal year ended June 30, 1981 was \$3,933,520, a decline of 18 percent from the record earnings of \$4,802,353 reported in the prior year. Earnings per share were \$1.27 (\$.34, \$.25, \$.31, and \$.37 by quarters), compared to the record \$1.63 in 1980. Revenues rose slightly to \$32,913,320, compared to \$32,561,623 in the prior year, with sales of uranium and gold increasing and uranium royalties, gains on metal futures transactions, and other income declining.

Uranium Mining

Profitability of the Johnny M Mine improved significantly over the prior year. The mine produced 341,940 pounds of uranium oxide (U_3O_8) in ore for the Company's account; 325,343 pounds were sold for \$11,664,506, or \$35.85 per pound. In 1980 the mine produced 292,859 pounds of U_3O_8 in ore for the Company's account, and 266,926 pounds were sold for \$8,793,297 or \$32.94 per pound. Pretax profit for 1981 was \$2,327,367 or \$7.15 per pound compared to \$779,972 or \$2.92 per pound in the prior year. The 17 percent increase in production, which greatly enhanced profitability, resulted primarily from mining a higher grade ore — .213% U_3O_8 compared to .182% U_3O_8 in the prior year. The increase in selling price was the result of making deliveries under a contract with a foreign utility company at increased prices.

The Hope Mine, a small uranium producer which was closed after year end because economic reserves were exhausted, operated profitably during the year. The Company's share of production totaled 23,935 tons of ore containing 55,314 pounds of U_3O_8 , compared to 17,916 tons containing 46,770 pounds in the prior year. Sales of ore produced from the property totaled \$1,014,438 or \$21.33 per pound, compared to \$1,255,958 or \$28.69 per pound in the prior year. Profit for 1981 was about \$8.30 per pound, down slightly from the previous year.

Copper Mining

The Company's copper operations showed a slight improvement in profitability over the prior year. At the Bluebird Mine, production increased 12 percent from 12,189,249 pounds of copper in the prior year to 13,598,470 pounds in 1981. Sales from the Bluebird declined approximately six percent because of lower copper prices, as well as a slight decrease in the number of pounds sold. The Old Reliable Mine, which was closed during

the year, had sales of \$1,255,557, compared to \$378,452 in the prior year and operated at a loss during both periods.

The pretax gains from metals futures transactions amounted to \$2,232,807 for the year, compared to \$3,565,373 in the prior year. As of June 30, 1981, the Company had an unrealized gain of about \$500,000 which carried forward into fiscal year 1982.

Uranium Royalties

Uranium royalties declined to \$2,492,878 in 1981 from \$3,577,682 in the previous year, which included a one-time payment of \$1,351,929 in settlement of litigation. Interest and other income also declined from the previous year as a result of the Company's increasing cash investment in the development and equipping of the Escalante silver mine.

Exploration and property maintenance costs increased from the prior year by about 27 percent, primarily because the Company increased expenditures in its search for precious metal, particularly through its interest in the 1980 Gold-Silver Exploration Program partnership. The Company's general and administrative expenses increased about 32 percent over the prior year because of expansion of the Company's facilities and staff and as a result of somewhat increased costs caused by inflation. The Company's interest expense of \$326,447 for 1981 has been capitalized in accordance with Financial Accounting Standards Board Statement #34, whereas in the prior year the expense of \$91,963 was charged to operations. The application of FASB #34 will result in additional charges to operations in future periods when the related assets are depreciated for financial statement purposes.

Financial Strength/Liquidity

The Company maintained its strong financial position in 1981 despite substantial requirements for funds to develop and equip the Escalante silver mine. As of June 30, 1981, the Company's current ratio was almost 3-to-1 as compared to 4.4-to-1 in 1980 and 1979. Of the approximately \$19 million expended on the Escalante Project as of June 30, 1981, about \$13 million came from internal sources, either cash on hand or cash flow from other operations. The balance of about \$6 million was obtained through a production payment financing agreement which may also provide up to an additional \$13 million in order to complete the project. Based on the project cost

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Silver operations were not profitable during the first quarter, due to low prices and start-up costs at the Greens Creek mine in Alaska. Hecla's share of the loss from initial start-up and production costs at Greens Creek amounted to \$900,000, which contributed to the overall loss in earnings during the first quarter. However, we are pleased with the progress of the start-up phase at the mine and the property is performing as expected and on schedule. Production at the Lucky Friday silver mine in North Idaho increased during the quarter, cutting the cost per ounce of silver produced, but not enough to show a profit for the quarter.

OLD RELIABLE

Hecla has agreed to a payment of \$1.6 million as part of a settlement of a lawsuit regarding the Old Reliable copper mine in Pinal County, Arizona. The current owners of the mine claim that Hecla, as a result of its merger with Ranchers Exploration and Development Corporation, is responsible for the expense of clean-up and treatment of mine water discharge at the site. Final details of the settlement are being worked out.

Canadian exploration costs rose during the first quarter, primarily due to increased expenditures at the Mooseland, Nova Scotia, gold project. The underground exploration program there should be completed by the end of 1989.

A new acquisition for the industrial minerals division was completed in February, when Hecla purchased the kaolin operations of Cyprus Minerals Company for \$11.2 million. The kaolin mines and plants are located in Georgia and South Carolina and initial operating results have been excellent during their short time as part of Kentucky-Tennessee Clay Company. Meanwhile, K-T Clay's ball clay division showed increased net income for the first quarter as a result of increased shipments of ball clay and improved selling prices.

Hecla also purchased the Apex germanium-gallium mine and processing plant near St. George, Utah, during the first quarter. The property was acquired for \$5.5 million from Musto Explorations Ltd. of Vancouver, B.C., and marks Hecla's entrance into production of specialty metals. Following rehabilitation, the property will be placed into production late this year and should be up to full production by June 1990.