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ASARCO TUC
ASARCO A NYK
ASARCO NY 12429470

W E SAEGART
TUCSON

YOU MAY PROCEED WITH CONTINENTAL MATERIALS AGREEMENT SUPERIOR
EAST DISTRICT AS OUTLINED BOWDITCH REYNOLDS LETTER DECEMBER 3
AND PLEASE SUBMIT ACCOUNTING FORMS 302 COVERING FIFTY FIVE THOUSAND
DOLLARS GEOLOGICAL STUDIES REFERRING MINUTES ADVISORY COMMITTEE
MEETING DECEMBER 9

COLLINS

+
ASARCO TUC
ASARCO A NYK

W.E.S.
DEC 29 1970

RECEIVED
DEC 29 1970
S. W. U. S. EXPL. DIV.

12-29-70
zml
11:07 P.M.

M

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

December 29, 1970

Mr. J. J. Collins
New York Office

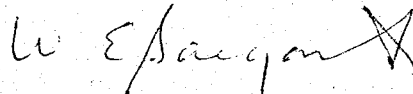
Dear Sir:

Subject: Property Agreement
Continental Materials Corp.
Margaret Group
Superior East Project
Pinal County, Arizona

I am enclosing a memo from Mr. J. E. A. McDonald covering his estimates of capital and operating costs for the hypothetical primary replacement copper deposit in limestone (Magma-Superior). These figures correspond to the Case 3 hypothetical deposit for our Superior East project evaluation. This memo from Mr. McDonald should be incorporated with my letter to you of December 24 on the same subject.

Mr. McDonald's figures are of the same magnitude as those provided by Mr. J. W. Still. An outcome analyses using McDonald's figures would be approximately the same as that which has been calculated using the Still figures. Accordingly, the outcome analyses for the hypothetical replacement copper deposit will not be modified at this time.

Very truly yours,



W. E. Saegart

WES:mw
Enc.

cc: W. L. Kurtz
R. B. Crist
J. D. Sell ✓
File - Route to
J. H. Courtright
S. I. Bowditch



AMERICAN SMELTING AND REFINING COMPANY
 MINING FOR NORTH AMERICA
 P. O. BOX 5777, TUCSON, ARIZONA 85703

W.E.S.
 DEC 29 1970

December 29, 1970

T. A. SNEDDEN
 GENERAL MANAGER

1150 NORTH 7TH AVENUE
 TELEPHONE 602-792-3010

Memorandum to Mr. W. E. Saegart

Hypothetical primary replacement copper deposit in limestone

25,000,000 tons @ ± 6% Cu

Allow 20% mining dilution

30,000,000 tons @ ± 5% Cu

Assumed mining rate 3,500 TPD (should be 4000)
 Yearly mining rate 3,500 x 350 = 1,225,000 tons
 15 years mining 1,225,000 x 15 = 18,375,000 tons

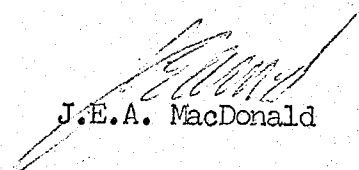
$$\frac{18}{30} \times 2100 = 1260$$

Depth of shafts 1260 + 1000 + 2000 + 240 = 4500

| | |
|---|---------------------|
| 9000' of shafts required @ \$1000/ft | \$ 9,000,000 |
| stations, pockets, crusher, sumps | 500,000 |
| 10000' of drifts, x cuts and decline @ \$125/ft | 1,250,000 |
| mine and surface plant (West Fork + 50%) | 2,880,000 |
| mine and surface equipment (West Fork + 50%) | 3,600,000 |
| | <u>\$17,230,000</u> |
| Stope preparation 4000 ft @ \$125/ft | 500,000 |
| | <u>\$17,730,000</u> |
| Contingencies at 10% | 1,770,000 |
| | <u>1,770,000</u> |
| Total | <u>\$19,500,000</u> |

Mining cost assume 10' x 10' slots filled with cemented fill on a production basis should be able to do this for same price as development that is \$125/ft advance.

If ore is 10 cu ft in place to the ton, the mining cost will be approximately \$12.50/ton.


 J.E.A. MacDonald

JEAM:dh

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

December 24, 1970

[REDACTED]

TO: Mr. John J. Collins
New York Office

FROM: W. E. Saegart

Subject: Property Agreement
Continental Materials Corp.
Margaret Group
Superior East Project
Pinal County, Arizona

Dear Sir:

Last week Jim Sell and I, together with three members of our exploration staff, visited several of the operating mines and prospects in the Miami and Superior districts. Considerable new information was obtained which contributes to our over-all knowledge of the mineral potential along this porphyry copper lineament. Pertinent new information concerning mines and the more important prospects is summarized below.

Inspiration Consolidated Copper Company

A tour was made of the Thornton, Live Oak and new Oxhide open pit mines. Inspiration geologists were particularly glib during discussions regarding their ore deposits and regional structural controls. Current production rates include 25,000 tons per day from the Thornton and Live Oak pits. Grade is averaging 0.7% Cu and production is divided as follows: 40% oxide, 20% mixed oxide and sulfide, and 40% sulfide. Five thousand tons per day are being mined by open pit from the Black Copper (Warrior) Mine, located one-half mile north of the Thornton pit. This ore consists of high grade copper oxides occurring as matrix cement in post-mineral Whitetail Conglomerate.

Twelve thousand tons per day of oxide copper averaging 0.5% Cu is currently being mined by rippers and scrapers from the new Oxhide property located one mile southwest of the Live Oak pit. Ore occurs in two separate deposits, one in granite porphyry and the other in Pinal schist. Judging from the size of the area being developed, reserves must be in excess of 50 million tons.

Inspiration is also developing a northern extension of the Live Oak pit known as the Red Hill area. Several thousand tons of additional production per day will be realized sometime later this year.

Miami Copper Company - Occidental Petroleum

The down faulted segment of the Miami-Inspiration ore body known as Miami-East is covered by a thick (+ 2500) section of Gila Conglomerate. Based on drill hole patterns and information published in a Cities Service prospectus dated October 1, 1969, we estimate reserves of the Miami-East deposit at 130 million tons averaging 1.5% Cu. This ore body has recently been extended under the town of Miami and further south on ground controlled by Occidental Petroleum (the Van Dyke property). Occidental has completed some 18-20 holes on their portion of the deposit and five drill rigs are currently working. No information is available regarding Occidental's results, but the outcome of this exploration will probably add significantly to the ore reserves of the district.

Miami has drilled out a major ore extension of their original caved ore body--extending north 2,000 ft. or more and underlying the upper circle townsite of ICC. According to Inspiration geologists, this Miami ore extension is economically feasible and negotiations are in progress concerning relocation of the townsite. *(the ground being owned by Miami)*.

Miami Copper completed measurement and metallurgical sample drilling of their Pinto Project (Castle Dome) in 1970. Reported reserves are 350 million tons at 0.45% Cu. According to the Inspiration geologists, the reserve is actually 550 million tons at this grade. This appears to be a realistic figure since the ultimate pit perimeter shown on Miami Copper maps is 6,000 feet in diameter.

Bluebird Mine - Ranchers Exploration & Development Co.

A visit was made to the Bluebird operation which is now producing one million pounds of cathode copper per month. Mining rate is 20,000 tons per day which is 50% ore and 50% waste. Total ore reserves, including all production to date, are 30 million tons averaging 0.5% copper (all oxide). Present reserves have not been extended more than 250 to 300 feet below the original surface where almost all holes ended in ore. Ultimate reserves will no doubt be far in excess of 30 million tons.

Magma-Superior

An underground visit was made of the stacked replacement ore bodies which have recently been placed in production. Replacement ore has now been discovered and partially developed in a fairly thick portion of the Paleozoic limestone sequence. Early discoveries of replacement ore at Superior were limited to the Devonian Martin limestone. During the past few years, three major replacement horizons have been discovered in the overlying Mississippian Escabrosa formation and one in the basal member of the Pennsylvanian Naco formation. In composite form, these ore replacement beds of the Escabrosa

and Naco formations can be described as a ^{30°}~~20°~~ dipping tabular body having dimensions of 2500' x 700' x 350' (thick) which is 50% ore. This generalization is based on a brief examination of Magma Copper Company ore sections. The ore replacement beds have been explored down-dip to the 4300' level with no limits yet established. We estimate present reserves at 25 million tons averaging 6% copper. A greater ultimate reserve is likely as the ore beds are developed down-dip and exploration extended higher in the thick Naco section.

The new discoveries and additions to reserves in the Miami and Superior Districts are indeed impressive. This porphyry copper lineament, as heretofore understood, was grossly underrated. Ultimate production will probably rival that of the Morenci-Metcalf District. The growing importance of the Miami-Superior belt firmly reinforces the exploration objectives and expectations of the Superior East project.

I am enclosing a one-inch = one-mile map showing the distribution of copper deposits which is an up-dated version of the map which accompanied my December 3rd letter to Mr. C. P. Pollock. This revised addition includes the new Miami East, Bluebird, and Oxhide deposits and also shows a western extension of the Cactus deposit to include the old Carlota Mine area.

Regional Structure

Considerable information was obtained during these discussions and examinations concerning the wide-spread importance of low-angle post-mineral, post-enrichment faulting. Most of the copper deposits in the eastern half of the district are terminated in depth by low angle post-mineral, post-enrichment faults. Inspiration geologists confirmed that the Live Oak and Thornton ore bodies are bottomed at depth by flat or low-angle faults. Faulting probably occurs along multiple imbricate surfaces rather than on a single fault plane. A vertical column through the hanging wall ore block and related imbricate slivers consists of alternating repetitions progressing downward of oxides-chalcocite-primary-oxides-chalcocite-primary, etc. This sequence is probably the result of fault slivers of chalcocite ore overriding oxidized blocks.

The Bluebird, Oxhide and Cactus-Carlota deposits are all terminated at depth by low-angle faults. Evidence of flat faulting is also pronounced along the eastern margin of the dacite plateau in the Powers Gulch zone of exotic copper.

We are now theorizing the existence in the Miami district of a gravity slide basement fault or faults of the Mission-Pima type. There is evidence in the Powers Gulch and Cactus-Carlota area that the flat faulting is pre-dacite in age. A reasonable possibility exists that some or most of the

copper deposits in the eastern part of the district were moved by gravity slide action from the area of the dacite plateau. This line of thinking is difficult if not impossible to confirm by outcrop evidence alone and supporting information from the many holes which have been drilled in the district is generally not available to ASARCO. Nevertheless, the possibility exists that a root of the Miami-Inspiration and related adjacent deposits does exist under the dacite cover in our Superior East project area. Such a root constitutes an important additional target for our pending exploration program. A primary disseminated copper deposit would likely be too low grade to be economic at the depths which exist on the dacite plateau. To be economic, a root deposit would probably have to have been exposed for a considerable period after the fault truncation to permit the development of a new chalcocite enriched blanket. There are at least two other known examples of chalcocite enrichment which has formed in footwall segments after the upper portion had been displaced by gravity sliding. These are La Caridad and Sacaton-Santa Cruz (Santa Cruz being the enriched footwall segment). Santa Cruz chalcocite, unfortunately, was mostly destroyed by oxidation.

In addition to exploring for a possible root of the Miami-Inspiration deposits, we also believe there is a good chance that the vein and replacement ore bodies at Superior represent lateral passage of hydrothermal fluids from an adjacent porphyry stock. An enriched porphyry copper deposit adjacent to the replacement ore beds on the eastern projection of the Magma vein systems is another important target objective of our Superior East program.

Any ore deposit occurring beneath the post mineral cover rocks of the dacite plateau would top out at depths ranging from a minimum of 2,000 feet to a maximum of perhaps 4,500 feet. To establish the feasibility of underground mining at these depths, we have developed two hypothetical ore deposits of the type we might reasonably expect to exist. Capital and operating costs and outcome analyses have been developed for these two hypothetical deposits. The first deposit is a replica of the Inspiration to Miami East ore deposit which has been limited to include only the higher grade ^{oxide and} chalcocite portions. This deposit is assumed to have a reserve of 400 million tons averaging 1.25% copper. Information sources for this reserve figure are tabulated as follows:

| <u>Deposit</u> | <u>Source</u> | <u>Tonnage and Grade</u> |
|----------------|---|-----------------------------|
| Miami | USGS PP 342 (Actual Production to 1962) | 135 million tons @ 1.0% Cu |
| Inspiration | USGS PP 342 (Actual Production to 1962) | 140 million tons @ 1.21% Cu |
| Miami-East | ASARCO Estimate (Data from 10/1/69. Cities Service Prospectus.) | 130 million tons @ 1.51% Cu |
| Occidental | -- | ? ? |
| TOTAL | | 405 million tons @ 1.24% Cu |

The second theoretical deposit is a replica of the stacked replacement ore bodies at Superior. Ore reserves are estimated at 25 million tons, grading 6% copper.

Two hypothetical situations were developed for the Miami-Inspiration type deposit which represent the anticipated extremes of depth to top: Case One, depth of 2,000 feet; and Case Two, depth of 4,500 feet. For the hypothetical replacement deposit, a depth of 3,000 feet to the up-dip extremity of ore was assumed. The down-dipped portion would extend to a depth somewhat below 5,000 feet.

Approximate mine plans, capital costs and operating costs were obtained for both hypothetical deposits from J. W. Still, and a similar estimate was prepared by Carl Williams for the Miami-Inspiration type. Milling capital and operating costs were supplied by G. W. Bossard. Freight, smelting and refining costs were obtained from A. J. Kroha. Outcome analyses were computer developed by Bob Crist and Carl Williams for each ore body type using both 45 and 50 cent copper. Capital and operating cost estimates prepared independently by Messrs. Still and Williams exhibit reasonably close comparisons. In each case, the highest estimated cost figures were used for the outcome analyses.

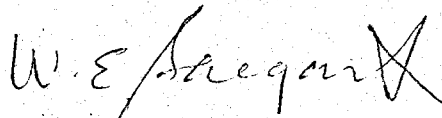
The outcome calculations were prepared assuming the existence of a profit sharing agreement of the type which has been negotiated with Continental Materials Corporation. Accordingly, the earnings cash flow includes only 80% of net profits after capital recovery. A 3% net smelter return royalty was added to operating costs to correspond to the underlying agreement between Continental and CanUS.

December 24, 1970

Reports by J. W. Still and memorandum from Carl Williams are enclosed, together with summary information of cost figures for each hypothetical mining scheme and the computer outcome print-outs. Return on investment is acceptable for all cases. The outcome (ASARCO's 80% of net profits) before taxes for the replacement (Superior) type deposit would be 28% at 45 cent copper. The deep (4,500 foot - Case 2) Miami-Inspiration type yields 15.5% R of I at 45 cent copper.

I am enclosing another copy of Mr. S. I. Bowditch's letter of December 3 to Mr. C. H. Reynolds of Continental Materials Corporation which outlines the basic terms we have negotiated for acquisition of their Margaret claim group. Mr. Reynolds advised me on December 11 that these terms are acceptable to his management. Acquisition of the Margaret claim group is essential since it covers a large part of the area we consider to be most favorable at our Superior East project. If you agree, please request approval in principle of the agreement format summarized in Mr. Bowditch's letter. If approved, Mr. Bowditch will prepare a complete agreement draft for submittal to Continental Materials Corporation.

Yours truly,



W. E. Saegart

WES:mw

Enc.

cc: W. L. Kurtz

R. B. Crist

J. D. Sell ✓

File - Route to

J. H. Courtright

S. I. Bowditch



AMERICAN SMELTING AND REFINING COMPANY
EXPLORATION DEPARTMENT
SOUTHWESTERN UNITED STATES DIVISION
P. O. BOX 5747, TUCSON, ARIZONA 85703

S. I. BOWDITCH
PROPERTY MANAGER

1150 NORTH 7TH AVENUE
TELEPHONE 602-792-3010

December 3, 1970

Mr. C. H. Reynolds
Continental Materials Corporation
810 South Ninth Street
Grand Junction, Colorado

Dear Mr. Reynolds:

This will summarize the tentative agreement which we came to in the conversations yesterday between you and Mr. Roscoe and Messrs Saegart, Sell, Crist and myself. Subject to confirmation by both our head offices, we will enter into an agreement with you covering only the Margaret Group of claims which you are purchasing from CanUS.

We agree to spend \$75,000.00 on the Margaret Group during the first year of the agreement and \$50,000.00 each year thereafter that the agreement is in force and effect. This money can be spent for geological, geochemical or geophysical work, drilling or other forms of physical prospecting and necessary surveying. We will take care of the assessment work on the claims but, we reserve the right to drop one or more claims from the agreement. However, this will not reduce the amount which we will be required to spend annually.

If we are fortunate enough to discover an ore body and decide to put the property into production, you will have a 20% interest in the net profits of the project and the option to obtain up to an additional 20% interest in the profits by paying us a similar proportion of all our expenses up to that point in excess of \$500,000.00 and advancing your proportionate share of all expenses from that time forward.

December 3, 1970

In the event that you do not elect to obtain more than your 20% carried interest, we will be reimbursed for all our expenses out of 100% of first profits. After we have been so reimbursed, the profits will be distributed 20% to you and 80% to us. If you elect to take an additional share, each of us will be reimbursed for our expenses out of the first profits in the same proportion that we shared the expenses. For example, if you elect to obtain a further 5% interest and thereby pay 5% of the expenses, profits would be split 5% to you and 95% to us until all previous expenses had been reimbursed - - - thereafter, profits would be divided 25% to you and 75% to us.

All capital expenses after the property is put into production will be treated as expenses, as in the joint program agreement which we discussed last summer.

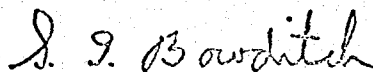
You will take care of the stock due to CanUS under your agreement with CanUS for your own account.

In the event that an ore body is discovered which lies both in your property and our property, both parties agree that at that time they will enter negotiations to develop reasonable accounting methods so that the total cost of the project may be properly proportioned between our ground and your ground. Because there are so many variables which cannot be foreseen at this time, it does not seem feasible to write details of such distribution into the agreement at this time.

We will, of course, have the right to cancel the agreement at any time.

If there is anything which I may have omitted or misinterpreted, I am sure you will let me know.

Yours very truly,



S. I. Bowditch

SIB/van

cc: Mr. C. H. Reynolds - Chicago
Mr. John Roscoe
Mr. C. P. Pollock
Mr. W. E. Saegart
Mr. W. L. Kurtz
Mr. J. D. Sell
Mr. R. B. Crist

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

December 22, 1970

W.E.S.
DEC 22 1970

MEMORANDUM TO: W. E. Saegart

SUBJECT: ESTIMATE OF A HYPOTHETICAL 40,000 TPD PRODUCTION
BLOCK CAVE MINE, 400 MILLION TON ORE RESERVE

Case #1: 2500 foot shaft

Summary of capital expenditures for the mine

| | |
|---------------------|-------------------|
| Mine surface plant | \$ 9,000,000 |
| Mine development | 25,505,500 |
| Mine equipment | <u>11,500,000</u> |
| Total preproduction | \$46,005,500 |

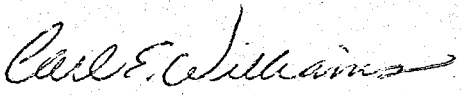
| | |
|--------------------------------------|----------------|
| Mining costs (directs and indirects) | \$1.40/ton |
| Further development | <u>.79/ton</u> |
| Total Mining cost | \$2.19/ton |

Case #2: 5000 foot shaft

Summary of capital expenditures for the mine

| | |
|---------------------|-------------------|
| Mine surface plant | \$9,000,000 |
| Mine development | 37,505,500 |
| Mine equipment | <u>11,500,000</u> |
| Total preproduction | \$58,005,500 |

| | |
|--------------------------------------|----------------|
| Mining costs (directs and indirects) | \$1.57/ton |
| Further development | <u>.79/ton</u> |
| Total mining cost | \$2.36/ton |


Carl E. Williams
Supervisor, Technical Systems

CEW:rms
cc: JEA MacDonald

J. W. STILL
Consulting Mining Engineer
5219 N. ORACLE RD. 602 887-5341
TUCSON, ARIZONA 85704

December 16, 1970

RECEIVED

DEC 18 1970

S. W. U. S. EXPL. DIV.

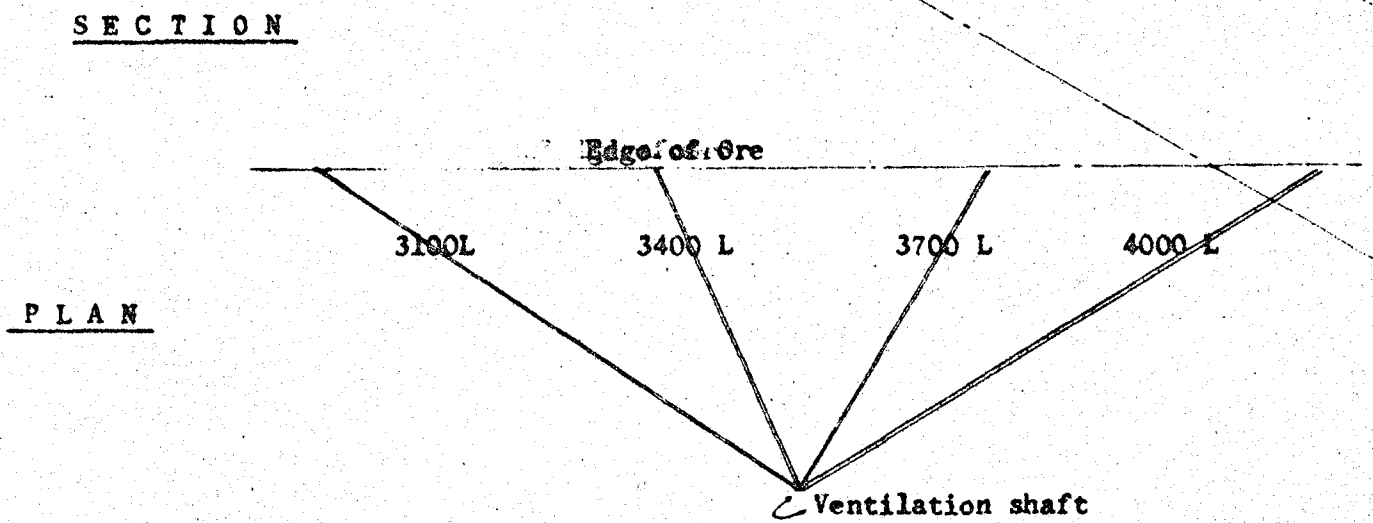
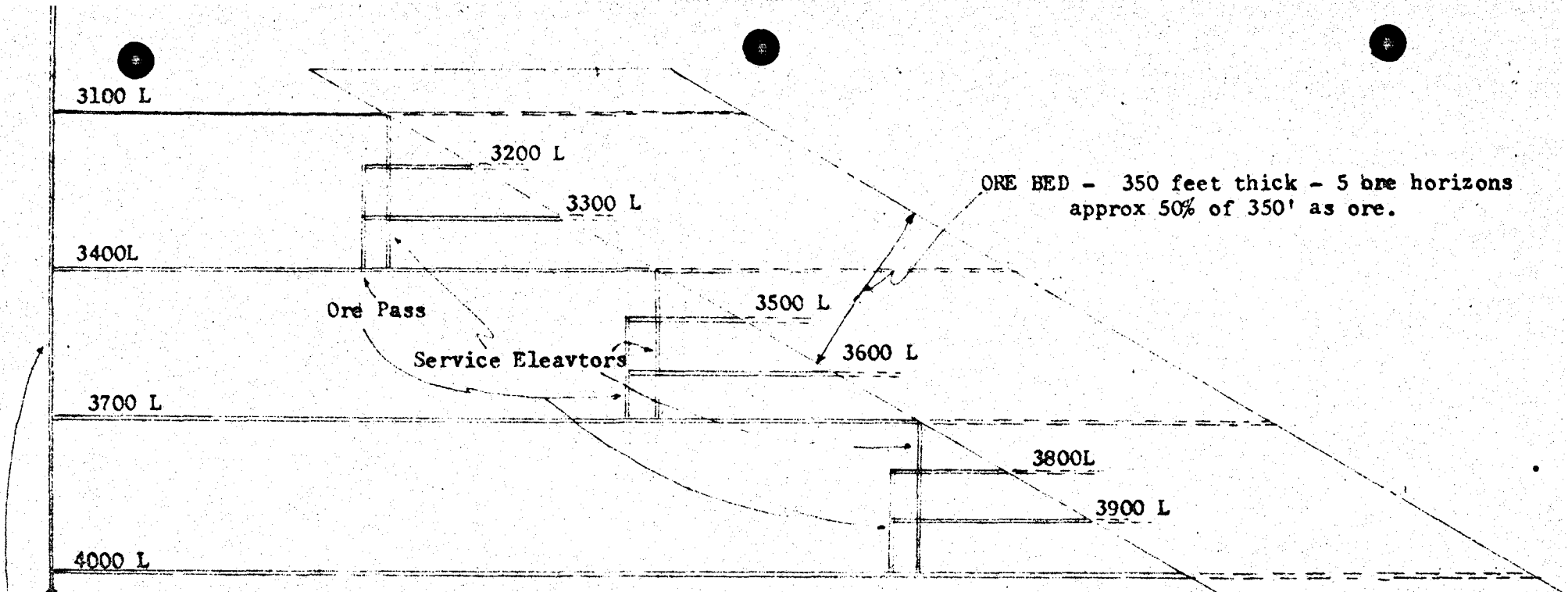
Mr. William E. Saegart
American Smelting & Refining Co.,
1150 North 7th Avenue
Tucson, Arizona 85705

Dear Sir:

Pursuant to your request, the following brief study was made on an assumed orebody to estimate the probable capital and operating costs. Attached, as Appendix "A", is a copy of the sketch you furnished me that shows the assumed depths and lay of this orebody. It is assumed to be a primary replacement copper deposit in limestone with 20 to 25 million tons of ore @ a grade of 6% copper. The top of the ore is assumed to be some 3000' below surface, overlain by 1000' of moderately indurated tuff and 2000' of dacite. The ore bed is assumed to dip at 30 degrees, be 350 feet thick and be about 50% ore. Also this ore bed is assumed to extend over 2100' vertically.

The next page shows a sketch on the general mining entry scheme that I have assumed to open up the upper half of this orebody. If it is assumed that an operation of 3500 tons/day is the proper size, this indicates on a 25 million ton reserve a life of some ²⁴ 20.4 years. *(30,000,000 tons after dilution)* The capital estimate that follows covers only the upper half of the assumed 2100 vertical feet orebed, as I feel that this would provide for 10 years mining - and in the latter part of this 10-year period the production and ventilation shafts could be deepened and a start made on opening up the levels below the 4000 Level.

As this sketch shows, the production and service shaft (4 compartments, cage, 2 skips & manway-counterweight) would be sunk so as to be about 500' distance from the ore-bed footwall at the top of this ore bed. From this shaft, at 300' intervals, four haulage drifts would be carried into the bed (3100, 3400, 3700, 4000). To open up levels at 100' intervals between the main haulages, ore pass and service elevators would be installed just under the footwall of the bed. These intermediate levels would be serviced by the 6-ton capacity elevators and ore and waste passed



MINING SCHEME
 For
 Hypothetical replacement Copper
 Deposit in Limestone.
 Scale 1" = 300'

to the haulage below. The ventilation shaft would be offset 500' distant from the edge of the ore - and major ventilation drifts run over to the hanging-wall edge of the ore on each of the four haulage levels.

On the mine equipment required, I am assuming that part of the mining (in the worst ground) will be cut and fill, using the continuous stringer-cement-sand fill scheme as now in use at Superior. In better ground I would assume some open stoping can be done by rock bolting the back (panel and pillar) with sand fill and subsequent pillar extraction. To make the 3500 t/d demand on a three-shift basis would require hoisting 1167 tons per shift - and assuming that four levels would be active at any one time, would require a production from each level of 292 tons per level per shift. I am also assuming that for the first ten years mining, 7-ton skips, hoisting in balance would be used. The original hoist design for this service should permit deeper hoisting at a later date (the additional 1050', below the 4000 Level) by larger motors and an increase in the hoisting speed.

ESTIMATED CAPITAL & OPERATING COSTS

The detail on these estimated capital costs will be found in Appendix "B" and the following section of this report. In summary, these estimates follow:

| | | |
|---------------------------------------|--------------|---------------------|
| Shafts, 2 | \$10,925,000 | |
| Mine Surface Plant | 3,550,000 | |
| Mine Equipment | 5,102,200 | |
| UG Work: Entries to orebody | 1,571,675 | |
| Stope preparation in ore | 2,400,000* | |
| | | \$23,548,875 |
| Contractors fee (10% on \$14,350,000) | | 1,435,000 |
| Design & Engr. (5% " \$14,350,000) | | 717,500 |
| Total Capital Cost Estimate | | \$25,701,375 |
| Operating Costs Estimate | | \$8.50 to \$11.50/t |

*This item part of later mining cost, not properly capital, but money would be required.

PERTINENT FACTORS

The current operation that resembles, in some degree, this assumed orebody, is the Magma operation at Superior, Arizona. Attached hereto as Appendix "C" and "D" is cost data over the years '64 thru '68 taken from a Newmont Prospectus dated 3/29/69. This is a hot mine with refrigeration cooling, with the active workings a long distance from surface, this distance being such that the company gets only about 4.5 hours work per 8-hour shift from the underground crew. It is also an old mine, somewhat locked in with rather small-size equipment, interior shafts and an extended ventilation and cooling setup. A good deal of the production in the past has been high-cost square set mining. The new expansion, now underway, will change many of these adverse factors and in the new orebody, it is hoped the ground conditions will be somewhat better. Just what costs they may make some three to four years from now, under the new conditions, is really impossible to say.

From the prospectus data, shown in Appendix "D", it appears that in a normal 350-day year, the Superior mill will handle about 1250 t/d (see years '65 and '66). It is quite apparent that in strike years, such as '67 and '68, this operation is quite vulnerable. In any event, using these prospectus figures and estimating the costs other than mining, the mining costs can be roughly estimated for the two normal years of '65 and '66 as follows:

| | '65 | '66 |
|-------------------------------------|----------------|----------------|
| Operating costs, total/ton | \$35.00 | \$40.34 |
| Less, milling, est @ | - 2.50 | - 2.50 |
| " Adm & Gen'l, est @ | - 1.50 | - 1.50 |
| " Freight, smelting & ref @ 6.5¢/lb | - 5.75 | - 5.90 |
| <u>Indicated mining cost/t</u> | <u>\$25.75</u> | <u>\$30.44</u> |

These costs indicate an extremely low tons/manshift efficiency, probably something under 3 tons/manshift.

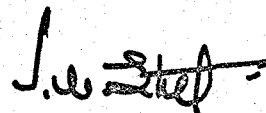
A new and planned operation, not burdened with the locked-in factors at the present Superior operation - and with ground conditions

somewhat better, and a mining layout where the mining done is in a somewhat reasonably condensed area (not spread out laterally or coming from numerous levels) - should make a much better tons/manshift efficiency. Inasmuch as this is a hypothetical orebody, with no data on the rock conditions, it is almost impossible to estimate a mining cost. However, under the conditions spelled out above - fair ground conditions, the mining area not spread out over too great an area, with proper design to accelerate ore handling (face to surface) - I would judge that an efficiency of 6 to 8 tons per manshift can be had. Assuming a \$40/manshift cost, with labor at 60% of the mining cost, this would mean a mining cost of from \$8.50 to \$11.25 per ton.

As you are aware - and at your request - not too much time has been spent on this study. As a consequence it should be considered on a "general order of magnitude basis." Obviously, many of the assumptions I have had to make may have to be altered when and if such an orebody is drilled out. In addition, some of the equipment I have assumed may be changed with improved new equipment, such as the raise drills currently being used in ventilation and ore pass work. In any event, for your present purpose, I feel it is reasonably realistic.

This will not be too large a mine, and on the manshift efficiencies estimated, the mine department crew will run from 450 to 580 men, with perhaps 20 to 30 mine foremen and bosses included in this group. Staffing a new underground operation with competent bosses under present conditions is a sizeable chore and some 2 to 5 years will be required to shake the operation down to where reasonable costs can be had.

I trust the above will cover the information you desired. In the event that you have any further questions, I would appreciate your so advising me.



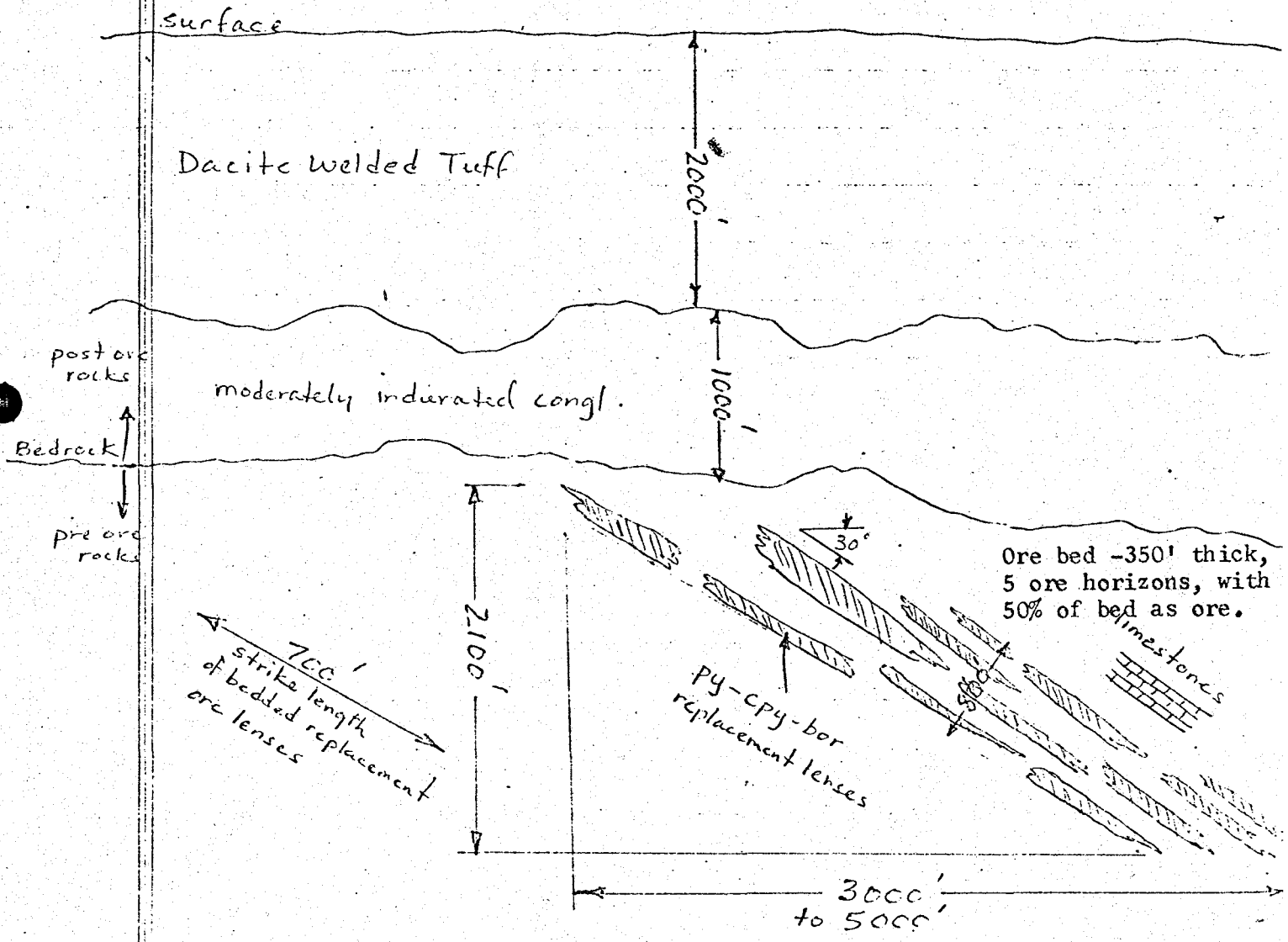
J. W. Still - Mining Engineer
Tucson, Arizona - 12/16/70

JWS:h
70

Hypothetical primary replacement Copper Deposit in limestone

Assume: 15,000,000 tons @ $\pm 6\%$ Cu.
 allow 20% mining dilut
 or. mined reserve 18,000,000 tons @ $\pm 5\%$
 Above later altered to 20-25 million tons,
 @ $\pm 6.00\%$ Cu

Longitudinal Section



mining method: Horizontal transverse slots (undercut) with cemented sand fill

Shafts.

| | | |
|---|--|---------------------|
| Pro Shaft - 4050' @ \$1266 | | \$ 5,129,000 |
| " " - 4 stations, pockets, loading station, etc. | | 1,000,000 |
| Vent Shaft - 3700' @ \$1255 | | 4,646,000 |
| " " - 4 stations, vent doors, etc. | | 150,000 |
| | | <u>\$10,925,000</u> |

Entry to Orebody

| | | |
|--|----------------|--------------|
| 3 - 300' Elevator shafts | \$225,000 | |
| 4 - Haulage entries | 730,625 | |
| 6 - Entries for elevator | 151,050 | |
| 3 - 300' Ore passes | 67,500 | |
| 1 - 300' Vent raise | 37,500 | |
| 4 - Connections, vent shaft to orebody | <u>360,000</u> | \$ 1,571,675 |

Mine Surface Plant

| | | |
|--|----------------|--------------|
| Site preparation | \$100,000 | |
| Hoist for skip, headframe, bins, etc., production shaft | 450,000 | |
| Hoist for man-supply cages | 300,000 | |
| Hoist for vent shaft, headframe, etc. | 200,000 | |
| 2 - hoist houses | 150,000 | |
| Compressors | 975,000 | |
| Compressor house, cooling towers, etc. | 150,000 | |
| Service shops | 300,000 | |
| Change room & mine office | 175,000 | |
| Mine surface power layout | 250,000 | |
| 5 - 7-ton skips | 50,000 | |
| 2 - man & supply cages | 50,000 | |
| Power & water development | <u>400,000</u> | \$ 3,550,000 |

Underground Mine Equipment

| | | |
|--|----------------|--------------|
| 35 Jackleg outfits @ \$1800 | \$ 63,000 | |
| 25 Stoper outfits @ \$1800 | 45,000 | |
| 4 - 6-ton trolley motors @ \$28,500 | 114,000 | |
| 6 4 1/2-ton battery motors @ \$28,500 | 171,000 | |
| 150 - 90 cu ft Granby type ore cars @ \$3300 | 495,000 | |
| 10 - Granby type car dumps | 50,000 | |
| Ventilator equipment, main & auxiliary | 125,000 | |
| Air cooling equipment | 1,250,000 | |
| 3 Elevator shaft layouts @ \$85,000 ea | 255,000 | |
| 4 Emco 21 muckers @ \$7100 | 29,600 | |
| 6 " 12B " @ \$5600 | 33,600 | |
| 10 DD air slushers | 36,000 | |
| 40 Supply cars @ \$1500 | 60,000 | |
| 2 Raise boring machines, 5'-7' raises | 400,000 | |
| 1 Tunnel " " , 12' | 500,000 | |
| Major pumps, pump columns, etc. | 300,000 | |
| Gathering and auxiliary pumps | 75,000 | |
| UG electrical layout | 1,000,000 | |
| Mine lights, safety, fire equip. phones, etc. | <u>100,000</u> | \$ 5,102,200 |

| | | |
|--------------------------------------|--------------|--------------|
| Shafts | \$10,925,000 | |
| Mine Surface Plant | 3,550,000 | |
| Underground Mine Equipment | 5,102,200 | |
| UG Work - Entry to Orebody | 1,571,675 | |
| Stope preparation - 4 levels | 2,400,000 | |
| | | <hr/> |
| | | \$23,548,875 |
| Contrators Fee on \$14,350,000 (10%) | | 1,435,000 |
| Design & Eng. " \$14,350,000 (5%) | | 717,500 |
| | | <hr/> |
| | | \$25,701,375 |

Production and costs at the Magma mine for the past five years have been as follows.

| | 1968 | 1967 | 1966 | 1965 | 1964 |
|--|----------------|--------------|--------------|------------|------------|
| Ore mined: | | | | | |
| Tons | 333,607 | 219,510 | 431,913 | 439,911 | 377,575 |
| % Copper | 4.63 | 4.77 | 4.70 | 4.65 | 4.78 |
| Payable metal content: | | | | | |
| Copper (tons)..... | 14,706 | 9,551 | 19,631 | 19,452 | 17,064 |
| Silver (ounces)..... | 347,119 | 197,419 | 466,334 | 408,366 | 306,269 |
| Gold (ounces)..... | 7,263 | 4,970 | 12,802 | 12,748 | 11,078 |
| Gross value per ton ore mined..... | \$42.38 | \$45.37 | \$44.02 | \$38.48 | \$31.51 |
| Operating cost, ⁽¹⁾ per ton ore mined | <u>\$45.47</u> | \$54.01 | \$40.34 | \$35.50 | \$37.58 |
| Other costs, ⁽²⁾ per ton ore mined.. | \$ 0.43 | \$ 0.93 | \$ 0.48 | \$ 0.18 | \$ 0.18 |
| <i>of margin</i> | <i>-30%</i> | <i>-\$61</i> | <i>+3.6%</i> | <i>+2%</i> | <i>-6%</i> |

(1) Including all operating costs, all Arizona taxes and federal social security taxes, but excluding depreciation and depletion. Includes strike expenses in 1968 and 1967.

(2) Includes depreciation, depletion and federal income taxes.

Operating costs have been high principally due to extensive timbering required to support the underground workings, high temperatures and humidity underground requiring expensive cooling facilities, long distances underground from existing shafts to the working areas, and to the obsolescence of much of the surface and underground facilities, and also in 1967 and 1968 costs were adversely affected by the eight months labor strike.

Extensive diamond drilling has developed additional replacement orebodies in beds lying stratigraphically above the areas presently being mined, and has increased the ore reserves to the highest tonnage in this mine's long history. As of December 31, 1968, total reserves at Superior were estimated at 10,100,000 tons of ore averaging 5.88% copper, before dilution.

The increased ore reserves have made feasible the commencement of an expansion program at Superior as described below.

Expansion Programs

As a result of the Kalamazoo acquisition, the Company has commenced a program to increase capacity at the San Manuel mine and plant from 40,000 to 60,000 tons of ore per day. This will require additional shaft sinking, mine development and plant expansion. Completion of the program is planned for 1971.

At Superior an expansion program also is underway to double the ore production there from 1,500 to 3,000 tons per day. The program includes an additional 4,800 foot mine ore shaft, a 9,100 foot tunnel on the 500 foot level, and modernization and expansion of the mine, mill and related facilities. The Superior smelter, however, will be abandoned, and the mill concentrates shipped to the expanded San Manuel smelter for smelting. Completion of the Superior expansion is scheduled for late 1972 with the production increase being gradual and fully accomplished two years after the program is completed.

Contracts for certain phases of the expansion programs at both mines have been negotiated. The cost of the two programs is expected to be in excess of \$100,000,000. The amount and nature of such

SUPERIOR OPERATION
5 years - '64 thru '68

Data from Newmont Prospectus dated 3/28/69

| | '64 | '65 | '66 | '67 | '68 |
|---|----------------|----------------|----------------|----------------|----------------|
| Tons Mined (1000's) | 377.6 | 439.9 | 431.9 | 219.5 | 333.6 |
| % Cu | 4.78 | 4.65 | 4.70 | 4.77 | 4.63 |
| Lbs Cu Rec/t | 90.4 | 88.4 | 90.9 | 87.02 | 88.16 |
| Ozs Ag Rec/t | .811 | .928 | 1.08 | .899 | 1.04 |
| Ozs Au Rec/t | .0293 | .0289 | .0296 | .0226 | .0218 |
| Rec Value/ton | \$31.51 | \$38.48 | \$44.02 | \$45.37 | \$42.38 |
| Op Cost/ton | 37.58 | 35.50 | 40.34 | 54.01 | 45.47 |
| Ind Operating Margin/t | \$6.07D | \$2.98 | \$3.68 | \$8.64D | \$3.09D |
| <u>Deduced from above:</u> | | | | | |
| Ind Tons/day -350 dy | 1078 | 1257 | 1234 | 627 | 953 |
| Av Selling price/lb Cu (includes Ag & Au Cr) | 34.86¢ | 53.52¢ | 48.42¢ | 52.13¢ | 48.07¢ |
| Value/t - Ag | \$1.05 | \$1.20 | \$1.40 | \$1.39 | \$2.23 |
| " " - Au | 1.03 | 1.01 | 1.04 | 0.79 | 0.86 |
| " " - Cu (by diff) | 29.43 | 36.27 | 41.58 | 43.19 | 39.29 |
| " " - Total | <u>\$31.51</u> | <u>\$38.48</u> | <u>\$44.02</u> | <u>\$45.37</u> | <u>\$42.38</u> |
| Ind sales/lb Cu | 32.55¢ | 41.03¢ | 45.74¢ | 49.63¢ | 44.57¢ |
| E&MJ Domestic Price | 31.96¢ | 35.02¢ | 36.17¢ | 38.23¢ | 41.85¢ |
| Indicated price over domestic | +0.59¢ | +6.01¢ | +9.57¢ | +11.40¢ | +2.72¢ |

J. W. STILL
Consulting Mining Engineer
5213 N. ORACLE RD. 602 887-5341
TUCSON, ARIZONA 85704

December 14, 1970

RECEIVED
DEC 15 1970
S. W. U. S. EXPL. DIV.

Mr. William E. Saegart
American Smelting & Refining Co.
1150 North 7th Avenue
Tucson, Arizona

Dear Sir:

Attached hereto is the brief study on costs on the assumed large disseminated orebody.

For your information, I have attached hereto the latest prospectus costs on both Superior and San Manuel--these having been xeroxed from the NEWMONT prospectus dated 3/28/69.

On the San Manuel costs, you will note that the "operating cost" for 1968 was given as \$3.72/ton. I would break this down (approximately) into the following items:

| | |
|-----------------|--|
| Mining | \$1.87 |
| Milling | 0.65 |
| Gen'l & Adm | <u>0.38</u> |
| To concentrate | 2.90 |
| F, S & R | <u>0.82</u> (6.5¢/lb on 12.68 lbs rec) |
| Total Operating | \$3.72 |

They are doing a first-class job at San Manuel, with a ton per manshift efficiency (everyone in the mine department) of something over 30 t/MS. Obviously no new operation is going to get up to this efficiency until several years after the operation gets going. In this connection you will also find attached a sheet headed "SAN MANUEL OPERATION '56 thru '65" which shows that they sweat a little blood with unduly high costs for the first 4.5 years of the operation.

With all of the best,

Sincerely,



J. W. Still

P.S. The experience at Urad with Induced Caving and an air blast is in the Mining Congress Journal, October 1970, page 39.

it for future production. The Company has spent approximately \$5,487,000 annually for the past five years in mine development expenditures. These expenses, together with costs capitalized in prior years with respect to shaft sinkings and attendant installations for the San Manuel orebody, are being charged to operating costs ratably as copper is produced from the ore developed and mined.

Sulphide ore reserves of the San Manuel mine as of December 31, 1968 are estimated, using an average 0.50% sulphide copper cut-off, to be 496,800,000 tons of 0.728% net sulphide copper, before dilution, of which 228,500,000 tons of 0.71% sulphide copper are above and can be mined from the second level. In addition, the estimated oxide ore reserves are 130,000,000 tons of 0.70% total copper (0.47% oxide copper), before dilution, all lying above the second level.

In March 1968, the Company purchased from Quintana Minerals, Ltd., under an agreement with that company and Newmont Mining Corporation, the Kalamazoo copper property adjoining the San Manuel mine in Arizona for \$27,000,000 in cash and stock equivalent. Quintana received from Magma \$15,000,000 in cash and 42,478 shares of Magma common stock, and from Newmont 78,208 shares of Newmont common stock and \$4,800,000 in cash, and Newmont received from Magma 169,912 shares of Magma common stock. The Kalamazoo property is estimated to contain 565,000,000 tons of sulphide ore averaging 0.72% net sulphide copper, before dilution. This orebody is believed to be similar to the San Manuel orebody though lying at a considerably greater depth with the top of the orebody approximately 2,500 feet below the surface of the ground.

San Manuel's production and costs for the past five years have been as follows:

| | <u>1968</u> | <u>1967</u> | <u>1966</u> | <u>1965</u> | <u>1964</u> |
|--|-------------|-------------|-------------|-------------|-------------|
| Ore mined: | | | | | |
| Tons | 11,367,640 | 7,891,854 | 14,391,355 | 13,504,024 | 12,442,752 |
| % Sulphide copper..... | 0.701 | 0.758 | 0.772 | 0.773 | 0.828 |
| Payable metal content: | | | | | |
| Copper (tons) | 72,074 | 53,963 | 101,390 | 93,767 | 92,589 |
| Molybdenum sulphide (tons) | 2,298 | 2,001 | 3,544 | 2,863 | 2,486 |
| Silver (ounces) | 245,316 | 166,893 | 311,699 | 273,610 | 282,334 |
| Gold (ounces) | 14,303 | 10,534 | 22,396 | 21,550 | 20,746 |
| Gross value per ton ore mined..... | \$ 5.97 | \$ 6.18 | \$ 6.47 | \$ 5.66 | \$ 5.46 |
| Operating costs ⁽¹⁾ per ton ore mined | \$ 3.72 | \$ 4.03 | \$ 3.33 | \$ 3.42 | \$ 3.39 |
| All other costs ⁽²⁾ per ton ore mined | \$.85 | \$ 1.08 | \$ 1.26 | \$.83 | \$.69 |

(1) Including all operating costs, all Arizona taxes, federal social security taxes, and amortization of deferred development, but excluding depreciation, depletion and interest. Includes effect of strike expenses in 1968 and 1967.

(2) Includes depreciation, depletion, interest and federal income taxes.

The above results for the years 1967 and 1968 reflect the adverse effect of the prolonged labor strike already mentioned.

Superior Division

The Magma mine at Superior is an underground mine having replacement or bedded-type orebodies. It is provided with access, transportation and aircooling facilities required for current operations. The surface plant includes a concentrator, smelter and related auxiliary facilities.

Production and costs at the Magma mine for the past five years have been as follows.

| | <u>1968</u> | <u>1967</u> | <u>1966</u> | <u>1965</u> | <u>1964</u> |
|--|-------------|-------------|-------------|-------------|-------------|
| Ore mined: | | | | | |
| Tons | 333,607 | 219,510 | 431,913 | 439,911 | 377,575 |
| % Copper | 4.63 | 4.77 | 4.70 | 4.65 | 4.78 |
| Payable metal content: | | | | | |
| Copper (tons)..... | 14,706 | 9,551 | 19,631 | 19,452 | 17,064 |
| Silver (ounces)..... | 347,119 | 197,419 | 466,334 | 408,366 | 306,269 |
| Gold (ounces)..... | 7,263 | 4,970 | 12,802 | 12,748 | 11,078 |
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| Operating cost, ⁽¹⁾ per ton ore mined | \$45.47 | \$54.01 | \$40.34 | \$35.50 | \$37.58 |
| Other costs, ⁽²⁾ per ton ore mined.. | \$ 0.43 | \$ 0.93 | \$ 0.48 | \$ 0.18 | \$ 0.18 |

(1) Including all operating costs, all Arizona taxes and federal social security taxes, but excluding depreciation and depletion. Includes strike expenses in 1968 and 1967.

(2) Includes depreciation, depletion and federal income taxes.

Operating costs have been high principally due to extensive timbering required to support the underground workings, high temperatures and humidity underground requiring expensive cooling facilities, long distances underground from existing shafts to the working areas, and to the obsolescence of much of the surface and underground facilities, and also in 1967 and 1968 costs were adversely affected by the eight months labor strike.

Extensive diamond drilling has developed additional replacement orebodies in beds lying stratigraphically above the areas presently being mined, and has increased the ore reserves to the highest tonnage in this mine's long history. As of December 31, 1968, total reserves at Superior were estimated at 10,100,000 tons of ore averaging 5.88% copper, before dilution.

The increased ore reserves have made feasible the commencement of an expansion program at Superior as described below.

Expansion Programs

As a result of the Kalamazoo acquisition, the Company has commenced a program to increase capacity at the San Manuel mine and plant from 40,000 to 60,000 tons of ore per day. This will require additional shaft sinking, mine development and plant expansion. Completion of the program is planned for 1971.

At Superior an expansion program also is underway to double the ore production there from 1,500 to 3,000 tons per day. The program includes an additional 4,800 foot mine ore shaft, a 9,100 foot tunnel on the 500 foot level, and modernization and expansion of the mine, mill and related facilities. The Superior smelter, however, will be abandoned, and the mill concentrates shipped to the expanded San Manuel smelter for smelting. Completion of the Superior expansion is scheduled for late 1972 with the production increase being gradual and fully accomplished two years after the program is completed.

Contracts for certain phases of the expansion programs at both mines have been negotiated. The cost of the two programs is expected to be in excess of \$100,000,000. The amount and nature of such

~~Appendix~~

SAN MANUEL MINE OPERATION - 1956 thru 1965

| Year | Pounds of Copper | Net/lb | Net \$'s | E&MJ Cu Price | Indicated Cost/lb Cu |
|------|------------------|----------|--------------|------------------|-------------------------|
| 1956 | 78,152,000 | @ 5.92¢ | \$4,626,598 | 41.82¢ | 35.90¢ |
| 57 | 119,798,000 | @ 2.09¢D | - 2,503,778 | 29.58¢ | 31.67¢ |
| 58 | 149,402,000 | @ 0.67¢ | 1,000,993 | 25.76¢ | 25.09¢ (1) |
| 59 | 92,340,000 | @ 1.89¢D | - 1,745,226 | 31.18¢ | 33.07¢ (2) |
| 60 | 163,448,000 | @ 5.05¢ | 8,254,124 | 32.05¢ | 27.00¢ |
| | 603,140,000 | @ 1.60¢ | \$9,632,711 | 31.13¢ | 29.53¢ |
| 1961 | 165,223,000 | @ 6.01¢ | \$9,929,902 | 29.92¢ | 23.91¢ |
| 62 | 168,416,000 | @ 6.15¢ | 10,357,584 | 30.6 ¢ | 24.45¢ |
| 63 | 177,072,000 | @ 5.93¢ | 10,500,369 | 30.6 ¢ | 24.67¢ |
| 64 | 185,177,000 | @ 11.88¢ | 21,999,028 | 31.96¢ | 20.08¢ |
| 65 | 187,534,000 | @ 10.08¢ | 18,903,427 | 35.02¢ | 24.94¢ (3) |
| | 883,422,000 | @ 8.11¢ | \$71,690,000 | 31.70¢ | 23.59¢ |

- Notes:
- (1) During this year some part of the production was sold on the loan floor price, which was greater than the 25.76¢ E&MJ price shown. If exact data were known on these sales, this would up the indicated cost.
 - (2) Operation was down part of year - on strike.
 - (3) This was first year any federal income tax was paid.

From the above data, it would appear that it took to the end of 1960 to shake the operation down and get up to plant capacity.

Also from the above data, the costs/lb of copper during the shake-down period ('56 thru '60) were about 6¢ per pound higher than were had when the operation was running smoothly from '61 thru '65.

The table above was worked up from such data as were available. A Newmont prospectus, dated 4/13/62, gave San Manuel costs and other data for the years '57 thru '61. For the years '62 thru '65, the Magma Copper Annual Report was used. The above data are not intended to be microscopically accurate, but in my opinion are a close approximation.

J. W. STILL
Consulting Mining Engineer
5213 N. ORACLE RD. 602 887-5341
TUCSON, ARIZONA 85704

December 12, 1970

Mr. William E. Saegart
American Smelting & Refining Co.
1150 North 7th Avenue
Tucson, Arizona

RECEIVED
DEC 15 1970
S. W. U. S. EXPL. DIV.

Dear Sir:

INTRODUCTION

Pursuant to your request, the following brief study was made on an assumed orebody to estimate the probable capital and operating costs. Attached, as Appendix "A", is a copy of the sketch you furnished me that shows the assumed depths and lay of this orebody. It is further assumed that it will have an ore reserve of 400,000,000 tons at a grade of 1.25% copper, and that it will be mined by block caving.

The shallow location assumption is that the top of the ore will lie 2000 feet below surface, with a vertical thickness of ore varying from 450 to 250 feet. Immediately overlying the ore will be some 600 feet of capping and conglomerate, which it is assumed will cave as readily as the ore. Overlying the conglomerate and extending to surface will be about 1400 feet of dacite which, it is assumed, will be difficult to cave.

The second assumption is that the ore bed will be of about the same thickness, but that it will lie some 2500 feet deeper, or some 4500 feet from the surface to the top of the ore. The material overlying the ore will be the same as noted in the preceding paragraph.

It is further assumed that the proposed operation would be at the rate of 40,000 tons/day, or on a 350-day year, 14,000,000 tons/yr - with an operation life of about ~~28.5~~ years.

31

(440,000,000 tons after dilution)

ESTIMATED CAPITAL & OPERATING COSTS

The detail on the basis of these costs will be found in the body of this report. In summary, the items estimated follow:

On shallow ore (top of ore 2000' below surface)

| | |
|---------------------------------|----------------------|
| Mine capital costs, estimated | \$50,914,735 |
| Mine operating costs, estimated | \$2.00 to \$2.15/ton |

On deep ore (top of ore 4500' below surface)

| | |
|---------------------------------|----------------------|
| Mine capital costs, estimated | \$76,045,485 |
| Mine operating costs, estimated | \$2.15 to \$2.30/ton |

PERTINENT FACTORS

On an operation of this size, some six years or so would be required to bring the mine to production. During the first 2- to 3-year period, I am assuming that two development shafts will be sunk, one outside a 45-degree crack line and the other (which will ultimately be lost) inside the orebody. During this time and working thru these two shafts, the orebody will be sufficiently explored (drifting and diamond drilling on any two levels) to ascertain the orebody stoping limits and establish the location of the ultimate mining sills or undercut levels. With this information in hand, a mining plan can be fitted to the orebody. Large samples for metallurgical testing will also be available from this work. Then over the next three years, the final production and service shafts can be finished, entries from these shafts driven into the orebody and the stope preparation work done.

The stop preparation costs are made up to cover 150' square stopes, with the undercut 25' above the draw or grizzly level and the haulage level 100' below this draw level. The draw lines are 37.5' apart and each draw line has 9 pair of draw raises, these draw points being spaced on the undercut level 18.75' x 16.67'. Each stope would require 4 four-branch and 4 five-branch transfer raises. This follows the old Miami underground pattern. It is assumed that both the fringes and draw lines would be concreted. The tally on this work for one stope is as follows:

| | |
|-------------------------------------|------------------|
| Haulage lines, 180' @ \$125/ft | \$ 22,500 |
| Pony sets & chutes 4 @ \$1000 | 4,000 |
| Transfer raises 8 - 1820' @ \$32.50 | 59,150 |
| Griz dfts, concrete, 720' @ \$205 | 147,600 |
| Griz fringes, " 180' @ \$205 | 36,900 |
| Draw raises, 1584' @ \$10 | 15,840 |
| Undercut, 22,500 sq ft @ \$2.77 | 62,250 |
| Total | <u>\$348,240</u> |

At a 300' head of ore,
one stope = 540,000 tons + 10% overdraw = 594,000 t or 58.6¢/ton

At a 400' head of ore,
one stope = 720,000 tons + 10% overdraw = 792,000 t or 43.9¢/ton

At a 500' head of ore,
one stope = 900,000 tons + 10% overdraw = 990,000 t or 35.2¢/ton

Assuming a draw of 15" of rock in place vertically per day in the stopes, each stope would produce 2250 tons. On a 40,000 t/d demand this means some 17.8 stopes in production. At the time 40,000 t/d production had been reached, considerable haulage and grizzly level fringes and transfer raise work on the next stopes coming up will have been done. To cover all this up to the start of production, I have estimated the "stope preparation" costs for 23.5 stopes.

I am assuming that the shafts and shaft facilities work will be done under contract, with the company taking over at the completion of the shafts and shaft stations.

In a block caving operation, all permanent structures (shafts, mine plant shops, etc.) must be placed outside the 45-degree crack line, that will ultimately result from the deepest ore caved. On the shallow ore assumption, with the bottom of the ore at a depth of 2450 feet, this means that the entries from the shafts to the orebody will be about 2600 feet in length. I would assume that with a gently dipping ore bottom, that two lifts would serve. This, assuming load and return lines on both haulage levels and two service entries, would total - for this entry work - 5200 feet of service drifts and 10,400 feet of haulage to get to the edge of the orebody.

On the deeper ore, this same factor would place the shaft some 5100 feet away from the edge of the orebody, and on the same two lift assumption, require 10,200 feet of service drifts and 20,400 feet of haulage drifting.

Obviously the shafts would be deeper for this deeper ore, the five shafts for this deeper ore totaling some 25,200 feet as against the 12,700 feet for the more shallow ore.

The mine capital costs I have estimated on the shallow ore are tabulated as follows - and a more detailed list will be found in Appendix "B" attached hereto.

| | | |
|---|-------------------|----------------|
| Shafts (5) | \$15,816,000 | |
| Mine Surface plant | 7,587,425 | |
| UG Mine equipment | 13,123,670 | |
| " Work: expl. drifts & D Drill | 1,560,000 | |
| entries to orebody | | |
| (2 lifts) | 1,794,000 | |
| stope preparation | <u>8,183,640*</u> | |
| | | \$48,064,735 |
| Contractors' fees (10% on \$19,000,000) | | 1,900,000 |
| Design & Engineering (5% on \$19,000,000) | | <u>950,000</u> |
| Total Capital Cost | | \$50,914,735 |

*This item is actually a deferred mining cost - and not properly capital - but the money will be required.

The operating costs on this shallow ore would, I would estimate, run from \$2.00 to \$2.15/ton. The main factor that influences this cost is the tons/manshift efficiency. This figure assumes about a 27 tons/MS factor and average mine department manshift costs @ \$40/MS. This also assumes an average vertical head of ore at about 400 feet. In a new underground operation of this size gathering an experienced crew of the various foremen and bosses will be difficult and it may take 3 to 5 years to shake the operation down to an efficient cost.

For the deeper ore, more shaft work will be necessary as well as larger hoists, more ventilation, cooling and pumping equipment. The total estimated capital costs on this being as follows:

| | | |
|---|-------------------|------------------|
| Shafts (5) | \$33,745,000 | |
| Mine Surface plant | 8,287,425 | |
| Mine equipment | 15,133,670 | |
| UG Work: expl. drifts & D Drill | 1,560,000 | |
| entries to orebody | 3,519,000 | |
| stope preparation | <u>8,183,640*</u> | |
| | | \$70,428,735 |
| Contractors' fees (10% on \$37,445,000) | | 3,744,500 |
| Design & Engineering (5% on \$37,445,000) | | <u>1,872,250</u> |
| Total Capital Cost | | \$76,045,485 |

*This item similar to that noted above.

The operating costs on the deeper ore will be somewhat more expensive, and I would estimate this cost at from \$2.15 to \$2.30 per ton. The greater depth will require more ventilation and cooling, may make considerable more water, and will increase the hoisting cost slightly.

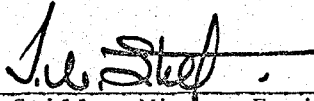
General Comments

In converting from in-place grade to mineable, block caving experience shows a 110% tonnage extraction (this dilution factor being inherent in the mining scheme) and an 89% to 91% grade extraction. On the 1.25% assumed in-place grade, this would mean 10% more tonnage and a grade reduction to about 1.13%.

As you are aware, this is a rather brief study - as you requested - and should be considered on a "general order of magnitude" basis. Obviously I have had to make numerous assumptions which may well be changed in the future as some mining techniques change. For example, large and efficient machines may be available to drill the size of shafts needed, as well as similar machines to do the major rather long drifts from the shafts to the orebody. In any event, for the present purpose, I feel that the estimates used are reasonably realistic.

The major problems on this hypothetical orebody is the cavability of the thick layer of dacite overlying the ore. While this will be likely to eventually cave when sufficient area is opened below it, the possible air blast hazard poses a large question mark. The thickness assumed on this dacite (1400 to 2400 feet) rubs out costwise any type of induced caving. Drilled 4' to 5' uncased holes, thru which dry fill could be passed and which would act as vents to surface in the event of a small air blast might be a solution to the problem. This might be thought at first glance to be too expensive, but if the hoped-for orebody drills out at 1.25% grade, costs on this dacite problem would not be too great a burden.

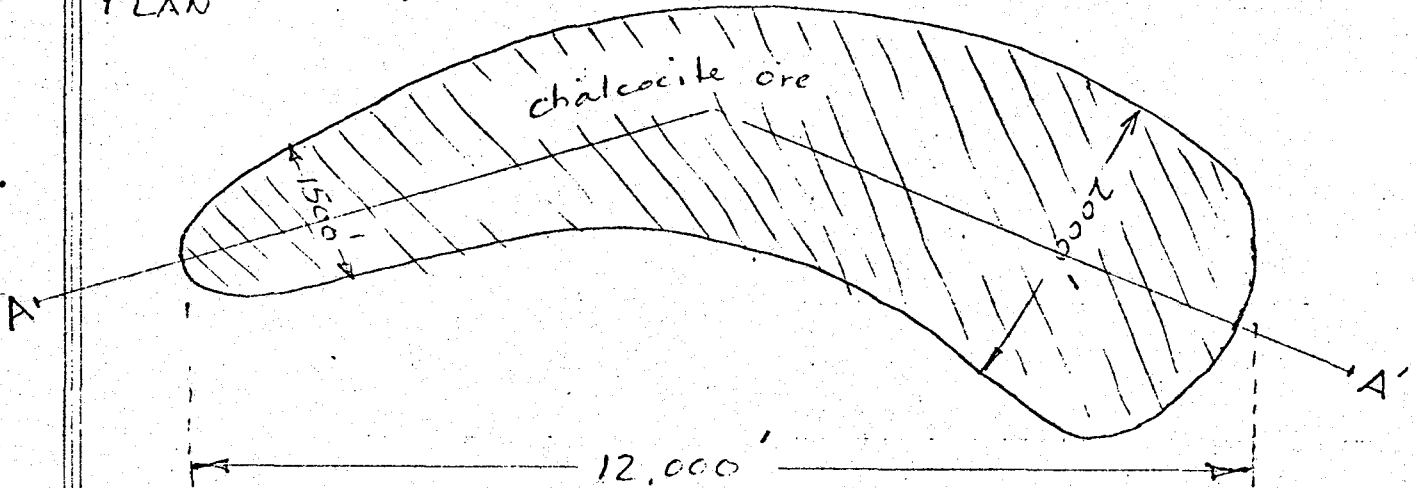
I trust the above will cover the data you desired. If you have any questions, I would appreciate your so advising me.


 J. W. Still - Mining Engineer
 Tucson, Arizona 12/12/70

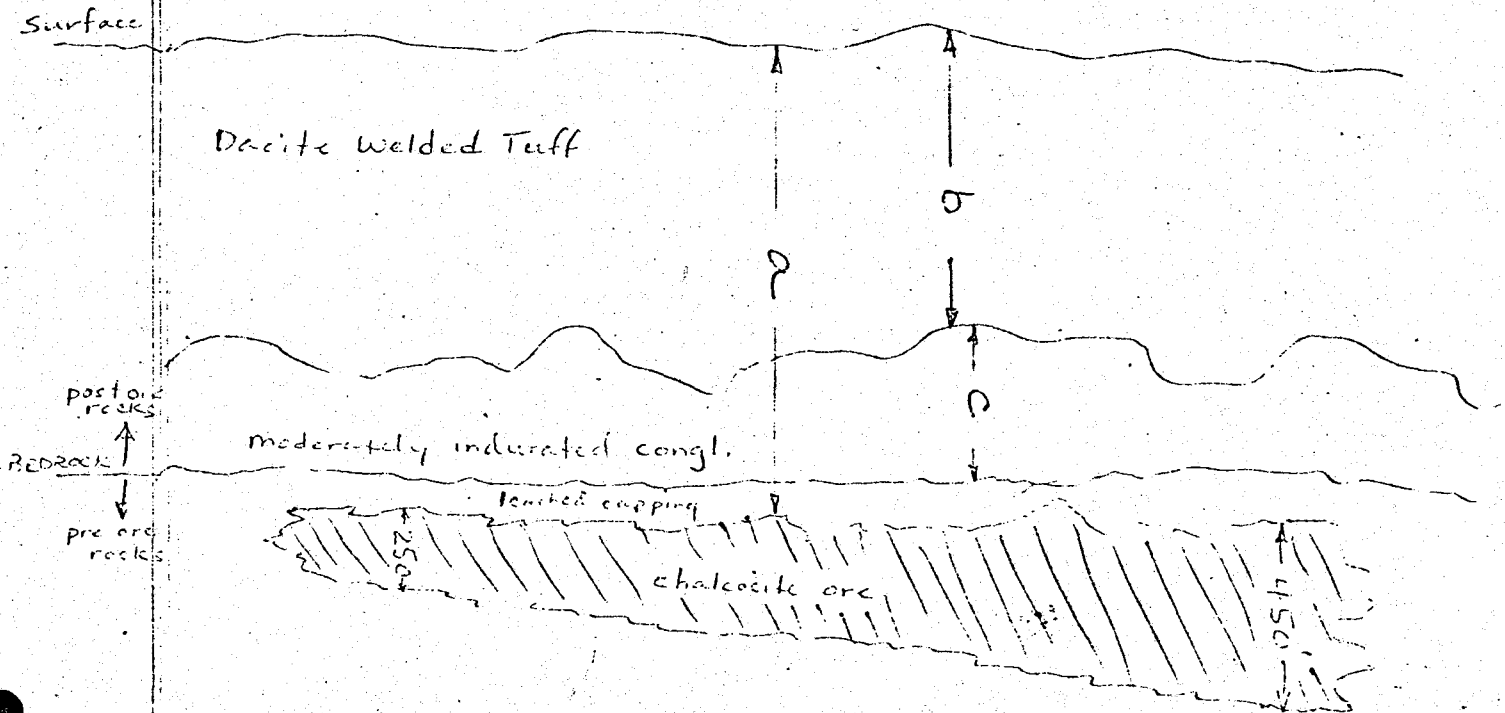
Hypothetical chalcocite enriched Por. Cu Deposit # 1

Assume: 400,000,000 tons
@ 1.25% Cu

PLAN



Section A-A'



| | Case I | Case II |
|---|--------|---------|
| a | 2000' | 4500' |
| b | 1400' | 2400' |
| c | 500' | 2000' |

Appendix "B" (con.)

| | Shallow Ore | Deep-Ore |
|--|---------------------|---------------------|
| 16 GD air slusher outfits | \$ 54,400 | same |
| 30 10 ton battery motors, chargers, etc. | 1,552,500 | " |
| 96 200 cu ft dev cars | 397,920 | " |
| 8 man cars | 59,600 | " |
| 120 supply cars | 330,000 | " |
| Concrete form jumbos | 69,000 | " |
| " forms | 600,000 | " |
| " placers | 125,000 | " |
| Major pumps, pump columns, etc. | 600,000 | \$ 1,200,000 |
| Gathering and auxiliary pumps | 100,000 | same |
| Mine lights, safety and fire equipment, etc. | 150,000 | " |
| Total Underground Mine Equipment | <u>\$13,123,670</u> | <u>\$15,133,670</u> |

NOTE For All Cases I, II, and III

Hypothetical reserves will be mined under the terms contained in the suggested Net Profits Lease.

Net profits to be shared 20%-80%, after all operating and post mining capital expenses are deducted, but excluding depreciation, depletion and Federal Income Tax.

Net Profits will not be shared until all pre-mining capital and exploration costs are returned plus interest at 8%.

Dec. 23, 1970

CASE I

Enriched Porphyry Copper
Miami-Inspiration Type

2,000 Ft. to Top

Reserves: 400,000,000 tons @ 1.25% Cu
90% grade extraction)
110% tonnage extraction) 440,000,000 tons @ 1.13% Cu

Mining: Block cave
40,000 tons/day
350 days per year - 14,000,000 tons/year
31 year life

Milling: 40,000 tons/day 85% rec 35% conc grade

Capital Cost: (5 year period)

| | | <u>Period Applied</u> |
|------------------|------------------|-----------------------|
| Mine | \$ 51,000,000 | Last 4 years |
| Mill* | 80,000,000 | Last 2 years |
| Water-Power | 10,000,000 | Last 3 years |
| Explor. Drilling | <u>3,000,000</u> | First 2 years |
| | \$144,000,000 | |

Net Smelter Return:

Gross Value per ton
\$.50 Cu (1.13) (20) (.38) (.85) = \$7.29
.45 Cu (1.13) (20) (.33) (.85) = 6.34

Operating Costs:

| | <u>.50 Cu</u> | <u>.45 Cu</u> |
|----------------------------|---------------|---------------|
| Mining (Direct & Indirect) | \$2.19 | \$2.19 |
| Milling - Direct | .65 | .65 |
| - Indirect | .30 | .30 |
| Admin.: NY & SW | .05 | .05 |
| Royalty 3% NSR | <u>.22</u> | <u>.19</u> |
| | \$3.41 | \$3.38 |

* Assumes \$2000/ton/day capital cost

Dec. 23, 1970

CASE II

Enriched Porphyry Copper
Miami-Inspiration Type

4,500 Ft. to Top

Reserves: 400,000,000 tons @ 1.25% Cu
90% grade extraction)
110% tonnage extraction) 440,000,000 tons @ 1.13% Cu

Mining: Block cave
40,000 tons/day
350 days per year - 14,000,000 tons/year
31 year life

Milling: 40,000 tons/day 85% rec 35% conc grade

Capital Cost: (6 year period)

| | | <u>Period Applied</u> |
|------------------|------------------|-----------------------|
| Mine | \$ 76,000,000 | Last 5 years |
| Mill* | 80,000,000 | Last 2 years |
| Water-Power | 10,000,000 | Last 3 years |
| Explor. Drilling | <u>6,000,000</u> | First 2 years |
| | \$172,000,000 | |

Net Smelter Return:

Gross Value per ton
\$.50 Cu (1.13) (20) (.38) (.85) = \$7.29
.45 Cu (1.13) (20) (.33) (.85) = 6.34

Operating Costs:

| | <u>.50 Cu</u> | <u>.45 Cu</u> |
|----------------------------|---------------|---------------|
| Mining (Direct & Indirect) | \$2.36 | \$2.36 |
| Milling - Direct | .65 | .65 |
| - Indirect | .30 | .30 |
| Admin.: NY & SW | .05 | .05 |
| Royalty 3% NSR | <u>.22</u> | <u>.19</u> |
| | \$3.58 | \$3.55 |

* Assumes \$2000/ton/day capital cost

Dec. 23, 1970

CASE III

Replacement Ore
Magma (Superior) Type

Reserves: 25,000,000 tons @ 6% Cu
5,000,000 tons Dilution
30,000,000 tons @ 5% Cu

Mining: Deep underground
Strike Slot Cut - Sand fill stoping
3,500 tons per day
350 days per year - 1,225,000 tons/year
24 year life

Milling: 3,500 tons/day 90% rec 25% conc grade

Capital Cost: (5. year period)

| | | <u>Period Applied</u> |
|------------------|------------------|-----------------------|
| Mine | \$26,000,000 | Last 3 years |
| Mill* | 10,500,000 | Last 2 years |
| Water-Power | 1,500,000 | Last 3 years |
| Explor. Drilling | <u>3,000,000</u> | First 2 years |
| | \$41,000,000 - | 5 Year lead time |

Net Smelter Return:

Gross Value per ton conc

\$.50 Cu (5.00) (20) (.38) (90%) = \$34.20
.45 Cu (5.00) (20) (.33) (90%) = 29.70

Operating Costs:

| | <u>.50 Cu</u> | <u>.45 Cu</u> |
|----------------------------|---------------|---------------|
| Mining (Direct & Indirect) | \$11.50 | \$11.50 |
| Milling - Direct | 1.10 | 1.10 |
| - Indirect | .50 | .50 |
| Royalty 3% NSR | 1.03 | .89 |
| NY & SW | <u>.10</u> | <u>.10</u> |
| | \$14.23 | \$14.09 |

* Assumes \$3000/ton/day capital cost

Dec. 23, 1970

CASE 1 - 50 CENT CU - BEFORE TAXES

CALCULATION ON RETURN OF INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

| YEAR OF CONSTRUCTION | EXPENDITURES FOR CONSTRUCTION | FACTOR AT 24.0 PCT | VALUE AT COMPLETION DATE |
|----------------------|-------------------------------|--------------------|--------------------------|
| 1ST | 3000000. | 2.63267 | 7898031. |
| 2ND | 12750000. | 2.12312 | 27069864. |
| 3RD | 15750000. | 1.71219 | 26967132. |
| 4TH | 55750000. | 1.38080 | 76979910. |
| 5TH | 56750000. | 1.11355 | 63194125. |
| TOTAL | 144000000. | | 202109063. |

TABLE B
EARNINGS FROM PROJECT

| YEAR | CASH EARNINGS BEFORE TAXES | PRESENT VALUE DISCOUNTED AT 24.0 PCT FACTOR | DISCOUNTED VALUE |
|-------|----------------------------|---|------------------|
| 1 | 54320000. | 0.806451 | 43806451. |
| 2 | 54320000. | 0.650364 | 35327783. |
| 3 | 53234000. | 0.524487 | 27920554. |
| 4 | 43456000. | 0.422973 | 18380740. |
| 5 | 43456000. | 0.341107 | 14823178. |
| 6 | 43456000. | 0.275086 | 11954175. |
| 7 | 43456000. | 0.221844 | 9640464. |
| 8 | 43456000. | 0.178906 | 7774568. |
| 9 | 43456000. | 0.144279 | 6269812. |
| 10 | 43456000. | 0.116354 | 5056300. |
| 11 | 43456000. | 0.093834 | 4077661. |
| 12 | 43456000. | 0.075672 | 3288437. |
| 13 | 43456000. | 0.061026 | 2651965. |
| 14 | 43456000. | 0.049214 | 2138681. |
| 15 | 43456000. | 0.039689 | 1724743. |
| 16 | 43456000. | 0.032007 | 1390922. |
| 17 | 43456000. | 0.025812 | 1121711. |
| 18 | 43456000. | 0.020816 | 904605. |
| 19 | 43456000. | 0.016787 | 729520. |
| 20 31 | 521472000. | 0.004618 | 2408179. |
| TOTAL | 1378642001. | | 201390459. |

CASE 1 - 45 CENT CU - BEFORE TAXES

CALCULATION ON RETURN OF INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

| YEAR OF CONSTRUCTION | EXPENDITURES FOR CONSTRUCTION | FACTOR AT 19.0 PCT | VALUE AT COMPLETION DATE |
|----------------------|-------------------------------|--------------------|--------------------------|
| 1ST | 3000000. | 2.18756 | 6562700. |
| 2ND | 12750000. | 1.83829 | 23438215. |
| 3RD | 15750000. | 1.54478 | 24330327. |
| 4TH | 55750000. | 1.29813 | 72371123. |
| 5TH | 56750000. | 1.09087 | 61906941. |
| TOTAL | 144000000. | | 188609308. |

TABLE B
EARNINGS FROM PROJECT

| YEAR | CASH EARNINGS BEFORE TAXES | PRESENT VALUE FACTOR DISCOUNTED AT 19.0 PCT | DISCOUNTED VALUE |
|-------|----------------------------|---|------------------|
| 1 | 40040000. | 0.840336 | 33647058. |
| 2 | 40040000. | 0.706164 | 28274839. |
| 3 | 40040000. | 0.593415 | 23760369. |
| 4 | 40040000. | 0.498668 | 19966696. |
| 5 | 32032000. | 0.419049 | 13422989. |
| 6 | 32032000. | 0.352142 | 11279823. |
| 7 | 32032000. | 0.295917 | 9478842. |
| 8 | 32032000. | 0.248670 | 7965414. |
| 9 | 32032000. | 0.208966 | 6693625. |
| 10 | 32032000. | 0.175602 | 5624895. |
| 11 | 32032000. | 0.147565 | 4726802. |
| 12 | 32032000. | 0.124004 | 3972103. |
| 13 | 32032000. | 0.104205 | 3337901. |
| 14 | 32032000. | 0.087567 | 2804959. |
| 15 | 32032000. | 0.073586 | 2357108. |
| 16 | 32032000. | 0.061837 | 1980763. |
| 17 | 32032000. | 0.051963 | 1664507. |
| 18 | 32032000. | 0.043667 | 1398745. |
| 19 | 32032000. | 0.036695 | 1175416. |
| 20-31 | 384384000. | 0.012921 | 4966966. |
| TOTAL | 1025024000. | | 188499830. |

CASE 2 - 50 CENT CU - BEFORE TAXES

CALCULATION ON RETURN OF INVESTMENT

TABLE A
INVESTMENT INVOLVED IN PROJECT

| YEAR OF CONSTRUCTION | EXPENDITURES FOR CONSTRUCTION | FACTOR AT 19.5 PCT | VALUE AT COMPLETION DATE |
|----------------------|-------------------------------|--------------------|--------------------------|
| 1ST | 3000000. | 2.66393 | 7991802. |
| 2ND | 3000000. | 2.22923 | 6687700. |
| 3RD | 19000000. | 1.86546 | 35443880. |
| 4TH | 22000000. | 1.56106 | 34343333. |
| 5TH | 62000000. | 1.30632 | 80992265. |
| 6TH | 63000000. | 1.09316 | 68869115. |
| TOTAL | 172000000. | | 234328097. |

TABLE B
EARNINGS FROM PROJECT

| YEAR | CASH EARNINGS BEFORE TAXES | PRESENT VALUE DISCOUNTED AT 19.5 PCT | |
|-------|----------------------------|--------------------------------------|------------------|
| | | FACTOR | DISCOUNTED VALUE |
| 1 | 51940000. | 0.836820 | 43464435. |
| 2 | 51940000. | 0.700267 | 36371912. |
| 3 | 51940000. | 0.585998 | 30436746. |
| 4 | 44668000. | 0.490375 | 21904073. |
| 5 | 41552000. | 0.410355 | 17051100. |
| 6 | 41552000. | 0.343393 | 14268703. |
| 7 | 41552000. | 0.287358 | 11940337. |
| 8 | 41552000. | 0.240467 | 9991914. |
| 9 | 41552000. | 0.201228 | 8361434. |
| 10 | 41552000. | 0.168391 | 6997016. |
| 11 | 41552000. | 0.140913 | 5855243. |
| 12 | 41552000. | 0.117919 | 4899785. |
| 13 | 41552000. | 0.098677 | 4100238. |
| 14 | 41552000. | 0.082575 | 3431162. |
| 15 | 41552000. | 0.069100 | 2871265. |
| 16 | 41552000. | 0.057824 | 2402732. |
| 17 | 41552000. | 0.048388 | 2010654. |
| 18 | 41552000. | 0.040492 | 1682556. |
| 19 | 41552000. | 0.033885 | 1407997. |
| 20-31 | 498624000. | 0.011635 | 5801970. |
| TOTAL | 1322392001. | | 235251280. |

CASE 2 - 45 CENT CU - BEFORE TAXES

CALCULATION ON RETURN OF INVESTMENT
TABLE A
INVESTMENT INVOLVED IN PROJECT

| YEAR OF CONSTRUCTION | EXPENDITURES FOR CONSTRUCTION | FACTOR AT 15.5 PCT | VALUE AT COMPLETION DATE |
|----------------------|-------------------------------|--------------------|--------------------------|
| 1ST | 3000000. | 2.20902 | 6627079. |
| 2ND | 3000000. | 1.91257 | 5737730. |
| 3RD | 19000000. | 1.65591 | 31462305. |
| 4TH | 22000000. | 1.43368 | 31541158. |
| 5TH | 62000000. | 1.24128 | 76959930. |
| 6TH | 63000000. | 1.07470 | 67706683. |
| TOTAL | 172000000. | | 220034888. |

TABLE B
EARNINGS FROM PROJECT

| YEAR | CASH EARNINGS BEFORE TAXES | PRESENT VALUE | |
|-------|----------------------------|-------------------------------|------------------|
| | | DISCOUNTED AT 15.5 PCT FACTOR | DISCOUNTED VALUE |
| 1 | 39060000. | 0.865800 | 33818181. |
| 2 | 39060000. | 0.749611 | 29279811. |
| 3 | 39060000. | 0.649013 | 25350485. |
| 4 | 39060000. | 0.561916 | 21948472. |
| 5 | 34373000. | 0.486508 | 16722743. |
| 6 | 31248000. | 0.421219 | 13162255. |
| 7 | 31248000. | 0.364691 | 11395892. |
| 8 | 31248000. | 0.315750 | 9866573. |
| 9 | 31248000. | 0.273377 | 8542487. |
| 10 | 31248000. | 0.236690 | 7396093. |
| 11 | 31248000. | 0.204926 | 6403544. |
| 12 | 31248000. | 0.177425 | 5544193. |
| 13 | 31248000. | 0.153615 | 4800167. |
| 14 | 31248000. | 0.133000 | 4155989. |
| 15 | 31248000. | 0.115151 | 3598259. |
| 16 | 31248000. | 0.099698 | 3115376. |
| 17 | 31248000. | 0.086318 | 2697295. |
| 18 | 31248000. | 0.074735 | 2335320. |
| 19 | 31248000. | 0.064705 | 2021922. |
| 20-31 | 374976000. | 0.027255 | 10220070. |

CASE 3 - 50 CENT CU - BEFORE TAXES

CALCULATION ON RETURN OF INVESTMENT
TABLE A
INVESTMENT INVOLVED IN PROJECT

| YEAR OF CONSTRUCTION | EXPENDITURES FOR CONSTRUCTION | FACTOR AT 33.0 PCT | VALUE AT COMPLETION DATE |
|----------------------|-------------------------------|--------------------|--------------------------|
| 1ST | 750000. | 3.60854 | 2706410. |
| 2ND | 2250000. | 2.71319 | 6104685. |
| 3RD | 8250000. | 2.03999 | 16829958. |
| 4TH | 12125000. | 1.53383 | 18597698. |
| 5TH | 17625000. | 1.15325 | 20326141. |
| TOTAL | 41000000. | | 64564894. |

TABLE B
EARNINGS FROM PROJECT

| YEAR | CASH EARNINGS BEFORE TAXES | PRESENT VALUE | |
|-------|----------------------------|-------------------------------|------------------|
| | | DISCOUNTED AT 33.0 PCT FACTOR | DISCOUNTED VALUE |
| 1 | 24463000. | 0.751879 | 18393233. |
| 2 | 23484000. | 0.565323 | 13276047. |
| 3 | 19570000. | 0.425054 | 8318325. |
| 4 | 19570000. | 0.319590 | 6254379. |
| 5 | 19570000. | 0.240293 | 4702541. |
| 6 | 19570000. | 0.180671 | 3535745. |
| 7 | 19570000. | 0.135843 | 2658455. |
| 8 | 19570000. | 0.102137 | 1998838. |
| 9 | 19570000. | 0.076795 | 1502886. |
| 10 | 19570000. | 0.057740 | 1129989. |
| 11 | 19570000. | 0.043414 | 849616. |
| 12 | 19570000. | 0.032642 | 638809. |
| 13 | 19570000. | 0.024543 | 480307. |
| 14 | 19570000. | 0.018453 | 361133. |
| 15 | 19570000. | 0.013874 | 271528. |
| 16 | 19570000. | 0.010432 | 204157. |
| 17 | 19570000. | 0.007843 | 153501. |
| 18 | 19570000. | 0.005897 | 115414. |
| 19 | 19570000. | 0.004434 | 86778. |
| 20-24 | 97850000. | 0.002173 | 212691. |
| TOTAL | 478487000. | | 65144380. |

CASE 3 - 45 CENT CU - BEFORE TAXES

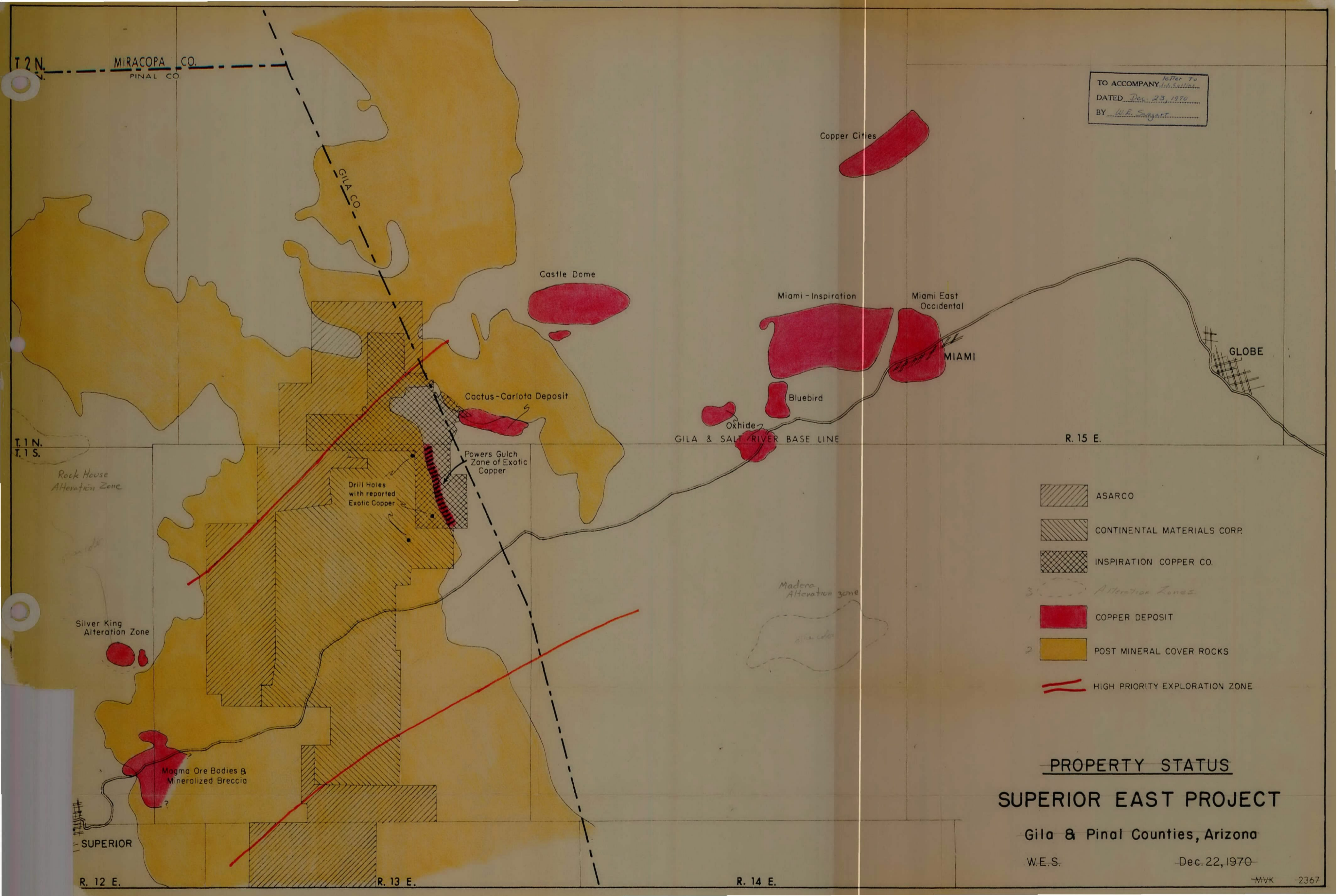
CALCULATION ON RETURN OF INVESTMENT
TABLE A
INVESTMENT INVOLVED IN PROJECT


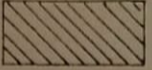

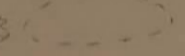

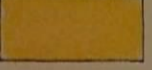
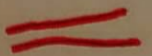
| YEAR OF CONSTRUCTION | EXPENDITURES FOR CONSTRUCTION | FACTOR AT 28.0 PCT | VALUE AT COMPLETION DATE |
|----------------------|-------------------------------|--------------------|--------------------------|
| 1ST | 750000. | 3.03700 | 2277750. |
| 2ND | 2250000. | 2.37265 | 5338477. |
| 3RD | 8250000. | 1.85363 | 15292513. |
| 4TH | 12125000. | 1.44815 | 17558875. |
| 5TH | 17625000. | 1.13137 | 19940411. |
| TOTAL | 41000000. | | 60408028. |

TABLE B
EARNINGS FROM PROJECT

| YEAR | CASH EARNINGS BEFORE TAXES | PRESENT VALUE | |
|----------|----------------------------|---------------|---|
| | | FACTOR | DISCOUNTED AT 28.0 PCT DISCOUNTED VALUE |
| 1 | 19122000. | 0.781250 | 14939062. |
| 2 | 19122000. | 0.610351 | 11671142. |
| 3 | 16446000. | 0.476837 | 7842063. |
| 4 | 15298000. | 0.372529 | 5698949. |
| 5 | 15298000. | 0.291038 | 4452304. |
| 6 | 15298000. | 0.227373 | 3478362. |
| 7 | 15298000. | 0.177635 | 2717470. |
| 8 | 15298000. | 0.138777 | 2123023. |
| 9 | 15298000. | 0.108420 | 1658612. |
| 10 | 15298000. | 0.084703 | 1295791. |
| 11 | 15298000. | 0.066174 | 1012336. |
| 12 | 15298000. | 0.051698 | 790888. |
| 13 | 15298000. | 0.040389 | 617881. |
| 14 | 15298000. | 0.031554 | 482719. |
| 15 | 15298000. | 0.024651 | 377124. |
| 16 | 15298000. | 0.019259 | 294628. |
| 17 | 15298000. | 0.015046 | 230178. |
| 18 | 15298000. | 0.011754 | 179827. |
| 19 | 15298000. | 0.009183 | 140489. |
| 20 - 24/ | 76490000. | 0.004954 | 378957. |
| TOTAL | 375948000. | | 60381815. |

TO ACCOMPANY *letter to*
 DATED *Dec 23, 1970*
 BY *W.E. Sargent*



-  ASARCO
-  CONTINENTAL MATERIALS CORP.
-  INSPIRATION COPPER CO.
-  Alteration Zones
-  COPPER DEPOSIT
-  POST MINERAL COVER ROCKS
-  HIGH PRIORITY EXPLORATION ZONE

PROPERTY STATUS
SUPERIOR EAST PROJECT

Gila & Pinal Counties, Arizona

W.E.S. Dec. 22, 1970