CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
520-770-3500
http://www.azgs.az.gov
inquiries@azgs.az.gov

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AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

December 24, 1970

PERSONAL AND CONFIDENTIAL

TO: Mr. John J. Collins
New York Office

FROM: W. E. Saegart

Detcomp Notes

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.

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%~~ 30° 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 prophyry 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:

Deposit	Source	Tonnage and Grade
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.

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

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.

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

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

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

December 14, 1970

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	0.38	
To concentrate	2.90	
F, S & R	0.82	(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:

	1968	1967	1966	1965	1964
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.

	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	$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

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~~ 31 years. (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	$348,240

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	8,183,640*	
		$48,064,735
Contractors' fees (10% on $19,000,000)		1,900,000
Design & Engineering (5% on $19,000,000)		950,000
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. drfts & D Drill	1,560,000	
entries to orebody	3,519,000	
stope preparation	8,183,640*	
		$70,428,735
Contractors' fees (10% on $37,445,000)		3,744,500
Design & Engineering (5% on $37,445,000		1,872,250
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.

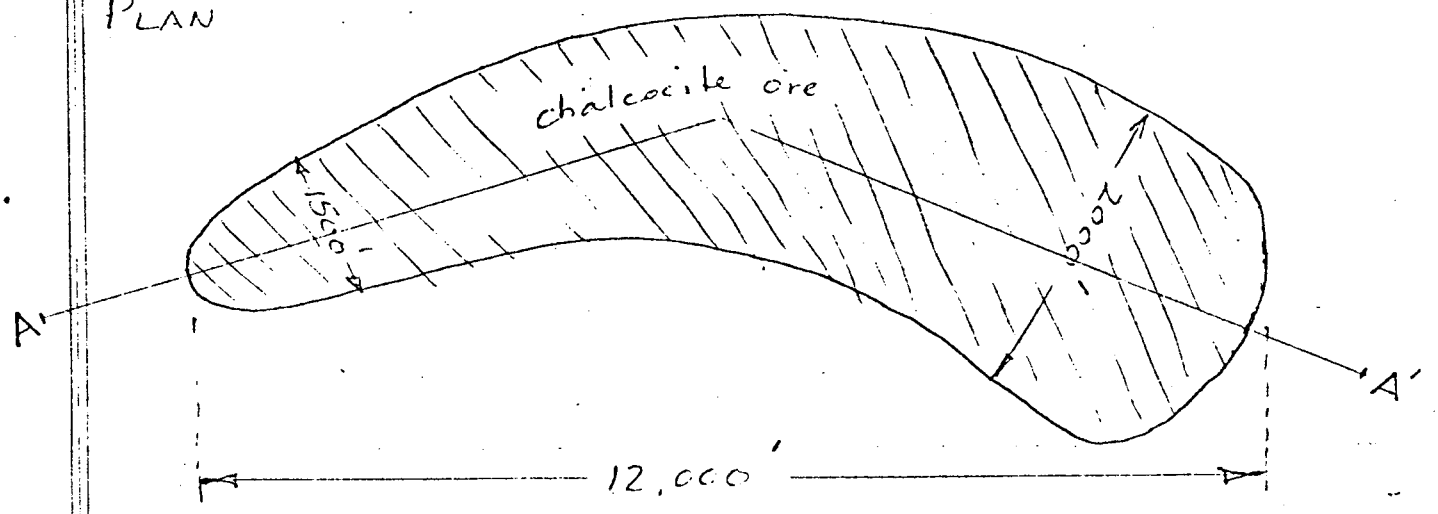
J. W. Still - Mining Engineer
Tucson, Arizona 12/12/70

JWS:h

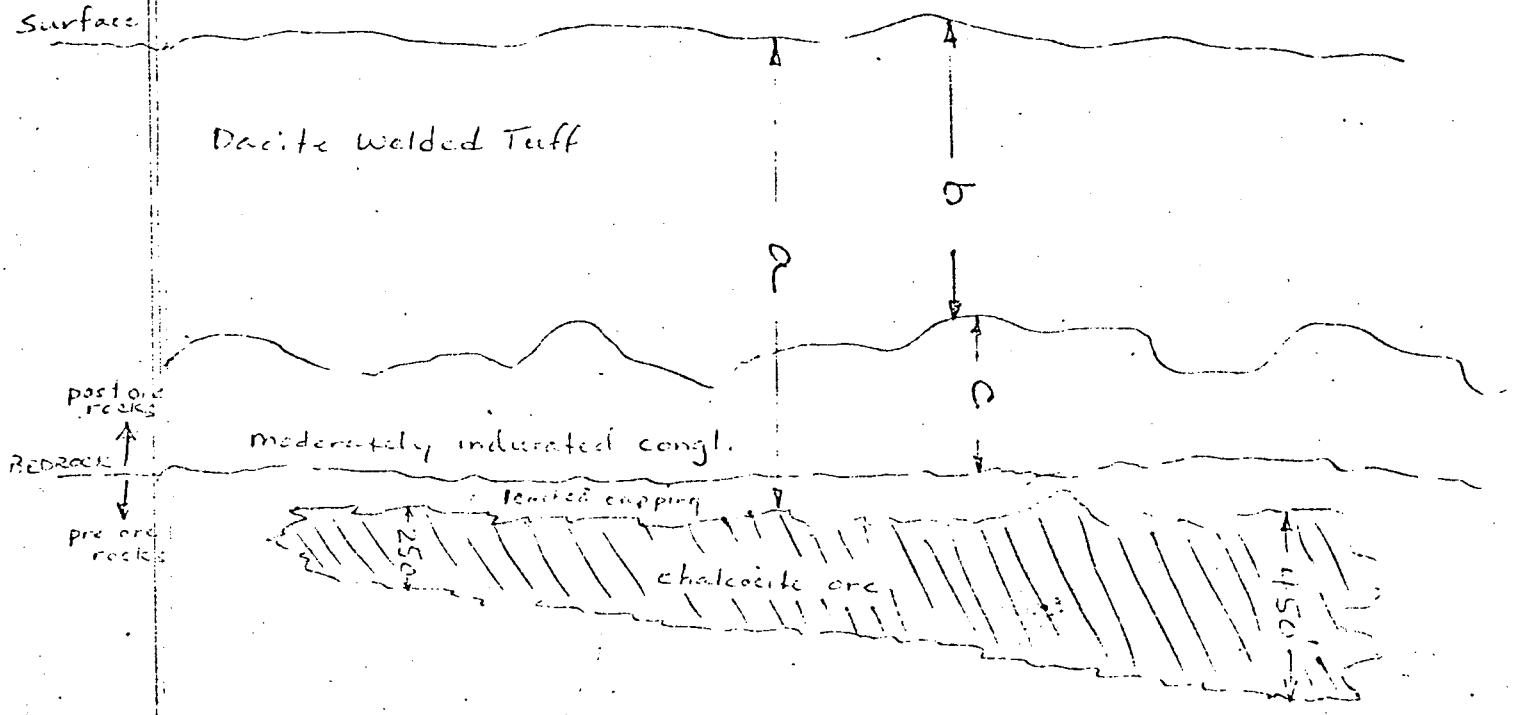
Hypothetical chalcocite enriched Por. Cu Deposit # 1

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'

ESTIMATED CAPITAL COSTS

	Shallow Ore	Deep Ore
Shafts		
Development shafts (2) 5000' @ $ 874	$ 4,370,000	
(2) 10000' @ $1173		$11,730,000
" " , Stations, etc	750,000	750,000
Service Shaft (1) 2500' @ $1040	$ 2,990,000	
(1) 5000' @ $1180		5,900,000
" " , Stations, etc	450,000	450,000
Hoisting Shafts (2) 5200' @ $1203	$ 6,256,000	
" " (2) 10200' @ $1364		13,915,000
" " , Stations, etc.	1,000,000	1,000,000
Total Shafts	$15,816,000	$33,745,000
Mine Surface Plant		
Site Preparation	$ 150,000	same
Hoist, headframe, bins, Dev Shafts	400,000	$ 500,000
" " " Ser "	250,000	350,000
" " " Pro "	2,700,000	3,200,000
3 hoist houses	300,000	same
Compressors, 5 3500 cfm	850,000	"
2 1600 cfm	124,000	"
Compressor house, cooling towers, etc.	150,000	"
Service shops, whse, shop tools, etc.	500,000	"
Change room & mine office	250,000	"
Mine surface power layout	550,000	"
5 25 ton skips	172,000	"
3 4 ton skips	18,975	"
3 man & supply cages	72,450	"
Power & water development	1,000,000	"
	$ 7,587,425	$ 8,287,425
Underground Mine Equipment		
18 30 ton trolley locomotives	$ 1,283,400	same
200 320 cu ft cars	1,380,000	"
3 track cleaning machines	86,250	"
Block signal, radio phones, etc.	55,000	"
2 sets rotary car dumps	230,000	"
Permanent track & trolley inst.	655,000	"
Ventilation equipment, main & aux.	160,000	$ 320,00
Air cooling equipment	1,250,000	2,500,000
UG electrical layout	2,450,000	same
50 Jaclegs outfits	91,500	"
50 Stoper "	90,000	"
15 Jumbo outfits	825,000	"
40 Jackhammers	13,500	"
16 40 H Eimco loaders	348,800	"
8 630 " "	101,200	"
8 24 " "	65,600	"

	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	$13,123,670	$15,133,670

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

December 16, 1970

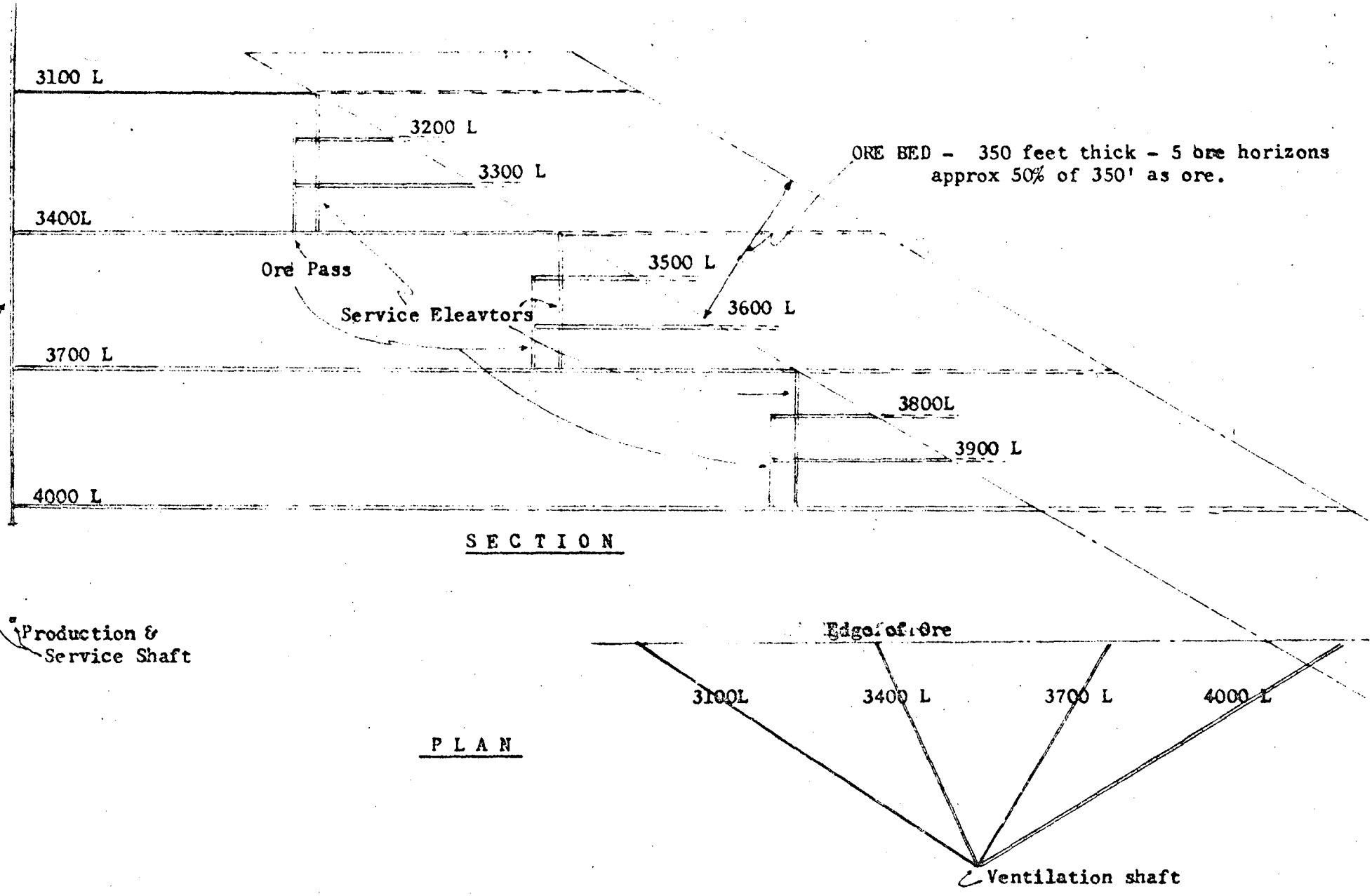
Mr. William E. Saegart
American Smelting & Refining Co.,
1150 North 7th Avenue
Tucson, Arizona 85705

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 your 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 ~~20.4~~ 24 (30,000,000 tons after dilution) years. 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'

Scale 1" = 300'

2

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 rquired.

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
Indicated mining cost/t	$25.75	$30.44

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

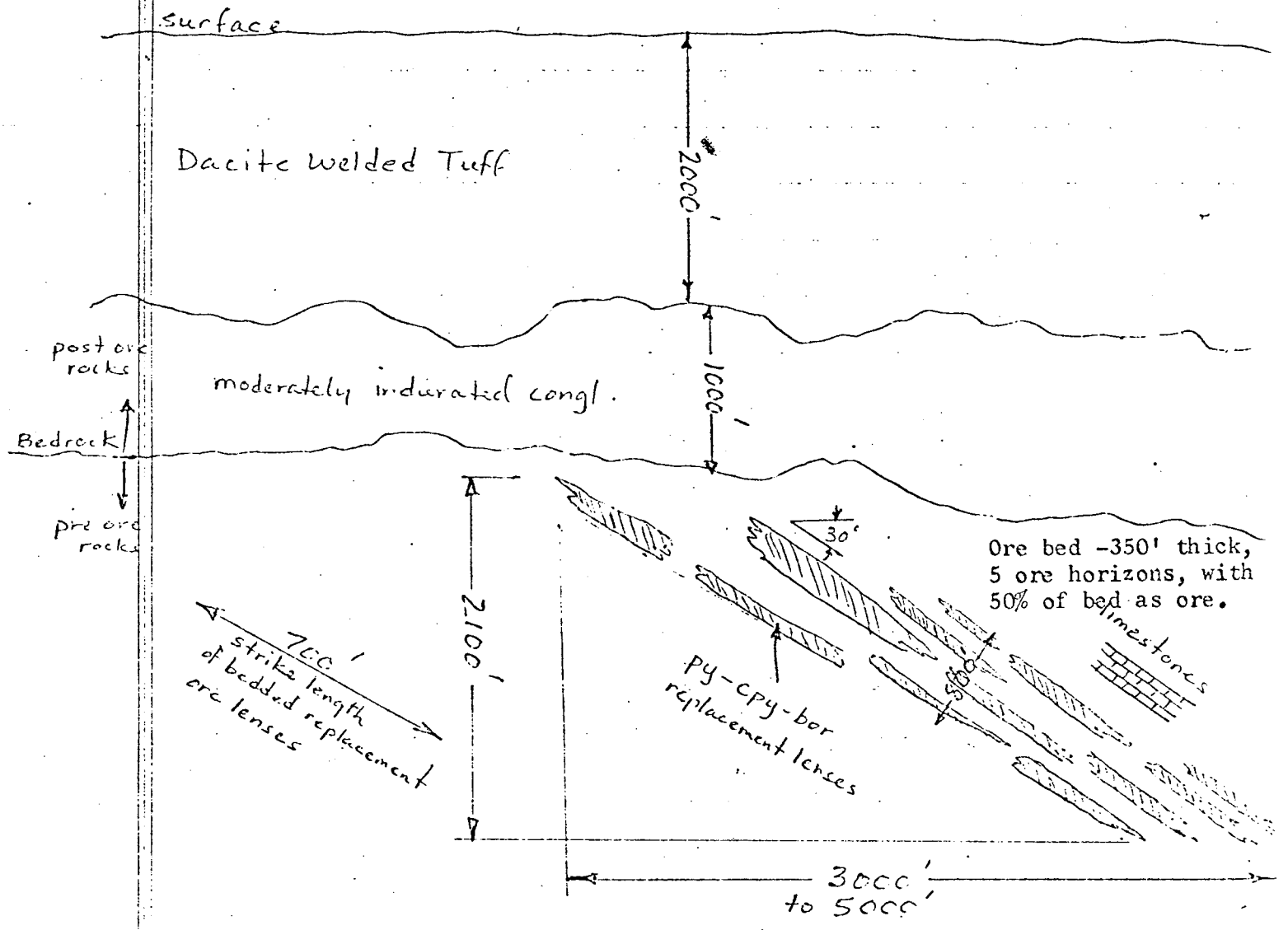
Assume: 15,000,000 tons @ ± 6% Cu

allow 20% mining dilut

or. mined reserve 18,000,000 tons @ ± 5%

Above later altered to 20-25 million tons, @ ± 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
		$10,925,000

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	360,000	
		$ 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	400,000	
		$ 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.	100,000	
		$ 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	
		$23,548,875
Contrators Fee on $14,350,000 (10%)		1,435,000
Design & Eng. " $14,350,000 (5%)		717,500
		$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	$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

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
Deduced from above:					
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	$31.51	$38.48	$44.02	$45.37	$42.38
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¢

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

W.E.S.
DEC 22 1970

December 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	11,500,000
Total preproduction	$46,005,500

Mining costs (directs and indirects)	$1.40/ton
Further development	.79/ton
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	11,500,000
Total preproduction	$58,005,500

Mining costs (directs and indirects)	$1.57/ton
Further development	.79/ton
Total mining cost	$2.36/ton

Carl E. Williams

Carl E. Williams
Supervisor, Technical Systems

CEW:rms
cc: JEA MacDonald

CASE I

Enriched Porphyry Copper
Miami-Inspiration Type

2,000 Ft. to Top

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

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)

		Period Applied
Mine	$ 51,000,000	Last 4 years
Mill*	80,000,000	Last 2 years
Water-Power	10,000,000	Last 3 years
Explor. Drilling	3,000,000	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:

	.50 Cu	.45 Cu
Mining (Direct & Indirect)	$2.19	$2.19
Milling - Direct	.65	.65
- Indirect	.30	.30
Admin.: NY & SW	.05	.05
Royalty 3% NSR	.22	.19
	$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) 440,000,000 tons @ 1.13% Cu
110% tonnage extraction)

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)

		Period Applied
Mine	$ 76,000,000	Last 5 years
Mill*	80,000,000	Last 2 years
Water-Power	10,000,000	Last 3 years
Explor. Drilling	6,000,000	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:

	.50 Cu	.45 Cu
Mining (Direct & Indirect)	$2.36	$2.36
Milling - Direct	.65	.65
- Indirect	.30	.30
Admin.: NY & SW	.05	.05
Royalty 3% NSR	.22	.19
	$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)

		Period Applied
Mine	$26,000,000	Last 3 years
Mill*	10,500,000	Last 2 years
Water-Power	1,500,000	Last 3 years
Explor. Drilling	3,000,000	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:

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

* Assumes $3000/ton/day capital cost

Dec. 23, 1970

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

W E S.
Supr. East
Prop.

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

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 37	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 DISCOUNTED AT 19.0 PCT FACTOR	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.
20-37	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.
20-37	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 DISCOUNTED AT 28.0 PCT FACTOR	PRESENT VALUE 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.

Castle Dome

Miami - Inspiration

Miami East
Occidental

MIAMI

GLOBE

Cactus-Carlota Deposit

Bluebird

Oxhide

GILA & SALT RIVER BASE LINE

R. 15 E.

Powers Gulch
Zone of Exotic
Copper

Drill Holes
with reported
Exotic Copper

R. 13 E.

R. 14 E.

ASARCO

CONTINENTAL MATERIALS CORP.

INSPIRATION COPPER CO.

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

MVK 2267

Castle Dome

Miami - Inspiration

Miami East Occidental

MIAMI

Bluebird

Cactus-Carlota Deposit

Oxhide

GILA & SALT RIVER BASE LINE

T. 1 N.
T. 1 S.

Powers Gulch Zone of Exotic Copper

Drill Holes with reported Exotic Copper

Silver King Alteration Zone

ma Ore Bodies &
neralized Breccia

SUPERIOR

R. 13 E.

R. 14 E.