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Preliminary Feasibility Study of San Juan Copper Property Near Safford, Arizona

by

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ESSEX INTERNATIONAL, INC.

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ABSTRACT

The San Juan copper property near Safford, Arizona provides a reasonable target to delimit a minimum of 18,000,000 tons of oxide-sulfide ore containing 0.5% copper with some gold and silver. Exploration work is required to test the deposit.

An investment of $18,397,000 is required to develop the mine and plant to treat 5,000 tons of ore per day for 10 years. This rate is equivalent to a copper production of 8660 tons of copper per year.

With copper at 60 cents per pound it is estimated that the investment will be recovered through the cash generated by the project at an annual rate of 11.78% compound interest.

Preliminary Feasibility Study of San Juan Copper Property Near Safford, Arizona

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Preliminary Feasibility Study of San Juan Copper Property Near Safford, Arizona

The following is a preliminary feasibility report on the San Juan copper property near Safford, Arizona. It is based on (1) an estimate of the quantity of ore reserves and copper content which will require further work; (2) test work on a grab sample taken in the present pit; (3) an estimate of capital expenditures based on file data rather than direct quotation. The estimated expenditures in this report are expected to be greater than those which a final feasibility study will show.

Property Location and Ownership

The San Juan copper property comprises some 1700 acres in the form of ten patented and seventy-five unpatented mining claims located about 8 miles north of the city of Safford in Graham County, Arizona. It is owned by a group of individuals from the Safford area. Essex International has acquired a 7.75% ownership in the property. It also has an exploration and a production lease agreement with the owners subject to the present lessors giving up their rights.

The property was leased to E.T. Scruggs et al in 1966 and a start was made at opening up an open pit on a zone of oxide copper ore. The mined ore was treated by crushing and leaching with sulfuric acid solutions. The equipment used was mostly leased. Scruggs could not apparently make a financial success of the operation and assigned the lease to Producers Minerals Corporation and its associates. Mining was continued until June 1970 and an estimated 1,500,000 tons of ore was removed from the pit, crushed, screened and placed in two leaching areas. The larger pile comprises the material minus one inch plus one quarter inch. The fines or minus one quarter inch material was placed in a separate ravine.

During all the leaching period, the ore was treated by a solution acidified with spent acid from an oil refinery operation at El Paso, Texas. The raw acid contains about 90% sulfuric acid and a considerable quantity of tars and sulfonic acid salts. At first, an attempt was made to clean out the tars and oil fractions of the spent acid by settling and skimming. For the past year, however, the raw uncleaned acid has either been dumped directly on the crushed rock or has been piped directly into the ponds feeding the solution circulating pumps.

During 1970, 1971, and the first half of 1972, Producers Minerals shipped 9,426,733 pounds of copper in the form of about 80% copper precipitates from the property. They received $3,936,310 in net smelter returns.

It would appear that some 50 to 60% of the copper in the dumps has now been recovered. The present operation does not seem to be profitable from a copper recovery standpoint, and is simply a means to dispose of the spent refinery acid. The "dirty" acid may be causing harm to the mineability of the ore zone extension and to the floatability of the copper sulfide content of the ore extensions.

Producers Minerals are in default on their lease agreement and steps have been taken to have the property revert to the owners.

Labor Supply

The city of Safford has a population of slightly over 5,000. The elevation is 2920 feet above sea level. Yearly temperatures are normal for this elevation in Arizona and vary between an average low of 28 degrees F. in winter and an average high of 100 degrees F. in summer. The average humidity is 20%.

The city is well supplied with hotels-motels, stores, churches, schools, banks, doctors, a hospital and other facilities. It is located on the main highway between Phoenix and El Paso. It is served by a line of the Southern Pacific Railroad.

Safford is a center for the Morenci mining and smelting area, some thirty miles away. In addition both Phelps-Dodge and Kennecott have other mining development programs underway in the district.

There should be no difficulty in finding experienced miners and plant workers in the area, or in providing housing and other facilities for them in Safford.

Power Supply

The Safford area is served by a high tension power line connected to a grid which covers most of Arizona.

In order not to excite the power company involved at this stage of our study, the rate structure of similar power services in the Tucson area is used for this report.

This rate is as follows:

Demand charge -
$2.625 per KW of billing demand per month.
Energy charge -
$.0050378 per KWH per month
with the usual minimum charges.

It is estimated that the complete installation described in this report will have a demand of 6500 KW and that the energy consumed will amount to 4,298,500 KWH per month or some 52,000,000 KWH per year.

Water Supply

There is an ample water supply in the area. Producers Minerals obtain water by pumping it about 2000 feet from a small pond on the San Juan property. The pond is being fed by a 10 inch steel pipe line from the neighboring Phelps-Dodge shaft. The flow at the time of observation seemed to be about 50 gallons per minute but was probably higher at other times. The total flow and availability of this water is unknown at the time of writing. Possibly a written agreement exists between Producers Minerals and Phelps-Dodge.

A large supply of water may be found in the Gila River Valley about six miles south of the San Juan property. It would probably be possible to purchase some farm land or potential farm land to sink shallow wells. The wells could be equipped with submersible electric pumps.

Ore Reserves

No accurate figure for the ore reserves and copper content is available from the geologists. After relogging and inspecting many of the Producers Minerals drill cores, and after reassaying a quantity of drill core pulps, they have calculated that a total of 3,973,000 tons of mixed oxide-sulfide ore grading 0.98% copper was present in the area drilled on the south border of the intrusive mass found on the San Juan claims. To obtain this figure, the geologists emphasize that their data is incomplete and that the preparation of the pulps may not have been up to their standard. The tonnage above includes the material which has already been mined.

The average grade of ore for the last two months of Producers Minerals crushing period (i.e. May and June 1970), was 0.64% and 0.74% copper, according to the records available to us.

The Essex geologists who have studied the situation agree that there is a possibility of outlining 18,000,000 tons of mixed oxide-sulfide

ore in the area under study, grading 0.5% copper. This can be considered a reasonable target. As soon as possible, it will be necessary for a team of geologists and drillers to undertake an exploration program in the target area. This program may take six months or more.

For the purpose of this preliminary study, we will use an estimated ore reserve of 18,000,000 tons grading 0.5% copper, and a treatment rate of 5,000 tons per day.

Preliminary Metallurgical Test Work

Preliminary metallurgical tests have been made on a 400 pound sample of San Juan ore taken from several points in the present pit. The sample contained 0.91% total copper, 0.009 ozs. gold per ton and 0.095 ozs. silver per ton. The "acid soluble" copper in the sample was found to be 0.74%.

Mineralogical examination of the ore showed appreciable quantities of pyrite, chalcopyrite, chalcocite, cuprite, magnetite, and hematite as well as various oxide copper minerals. Grains of gold were identified both in gravity concentrates and in polished sections.

A series of leach tests with sulfuric acid solutions indicated that by grinding to minus 35 mesh, 80.2% of the total copper in the ore can be extracted in 5½ hours of agitation, with an acid consumption of 4.5 lbs. acid per pound of copper extracted. By crushing the ore to minus three-eighths inch, and treating it in a column (or vat) some 60 to 65% of the total copper is dissolved in 8 days with an acid consumption of 3.2 lbs. acid per pound of copper extracted.

A check on the agitation leach tails showed that some 10% of the total copper in the ore is in the form of sulfides or other floatable copper minerals. One would expect that a fair percentage of the gold and silver could be recovered in the flotation procedure.

For the purposes of this preliminary study, the finer grind (minus 35 mesh) and the use of agitation leaching and flotation will be used. A flotation recovery of 9% of the total copper, and 50% of the gold and silver would seem reasonable. The recovery of 70-75% of the total copper by leaching could be used.

There is some question as to what depth in the ore zone, the proportion of sulfides will increase materially. In order to profitably treat the mixed oxide-sulfide ore it would be wise to consider the installation of the flotation circuit in the original construction.

Mining Program

The mining portion of this study was compiled by David Beling, mining engineer, and manager of the Milford Mine. Direct quotes from his report will be used where possible.

"This study provides order-of-magnitude operating and capital cost estimates for mining 1,800,000 tons of ore per year. Conceptual mine plans have not been generated for the basis of the estimates since there is virtually no reserve calculations or useful maps available to support such plans. Thus, the projections in this study are based in large measure on assumptions, and must be used with caution."

"The study assumes 18,000,000 tons of mineable ore reserves overlain by 28,300,000 tons of waste; or an overall ratio of 1.57 tons of waste per ton of ore."

"Removal of 3,000,000 tons of waste is assumed during a seven month pre-production stripping period. Subsequent stripping during production is scheduled at an average rate of 211,000 tons of waste per month."

"Mining and stripping operations are scheduled for two shifts per day and 22 days per month, with lubrication services scheduled on weekends and night shift. Production is based on 20 effective days (90% availability) to provide for normal down time."

"Expenses to develop the orebody and strip 3,000,000 tons of waste total some $825,000, or $0.275 per ton."

"The initial capital cost of $2,139,000 includes mine and maintenance equipment, an integrated mine operations office-shop-warehouse-changehouse building, a fueling station and necessary working capital."

Treatment Plant Description

Site

There are several possible plant sites on the property within a mile of the pit area. A firm choice can be made when surveys of the general area are made. The actual choice will probably depend on the tailings area chosen.

The choice of the following equipment is of a preliminary nature and is for the purpose of estimating the capital expenditures and power required for the plant. In the final study the actual capital expenditures may be slightly lower than in the following estimate.

Crushing Plant

It will probably be advantageous to operate the primary crusher at all times when the trucks are hauling ore to the treatment plant. If the trucks operate two shifts per day on a five day week, this would be a primary crushing rate of 438 tons per hour.

The primary crusher could be a gyratory crusher with a 5" open side opening. The trucks could dump directly into a feed box equipped with a pan conveyor to feed the crusher. The crushed ore could be conveyed on a 48" conveyor to a coarse ore stockpile of about 20,000 tons capacity.

The minus 5" material could be withdrawn from the stockpiles by belt feeders located in a reclaiming tunnel under the pile. The ore could be fed to a 6'x14' single deck screen equipped with a 1/2" screen opening. The fine ore (minus 1/2") would be conveyed to one of two fine ore stockpiles. The oversize of the screen would be split between two secondary crushing circuits. Each secondary circuit would consist of a 5'x12' double deck screen having a 1/2" opening on the bottom deck and a 1½" opening on the top deck. The plus 1½" material would be fed to a 5' Standard gyratory crusher set 1½" on the closed side. The minus 1½" plus 1/2" material would be fed to a 7½' short head gyratory crusher set 1/2" on the closed side. The discharges of both crushers would be conveyed to the 5'x12' double deck screen to close the circuit. The duplicate secondary circuit would allow for ample crushing capacity and for shutdowns to either circuit for repairs and liner replacements.

The crushing plant will be of open type construction and would be serviced by a truck crane. Space will be left to extend the fine ore storage capacity and thus to increase the treatment capacity at a later date.

Grinding Circuit

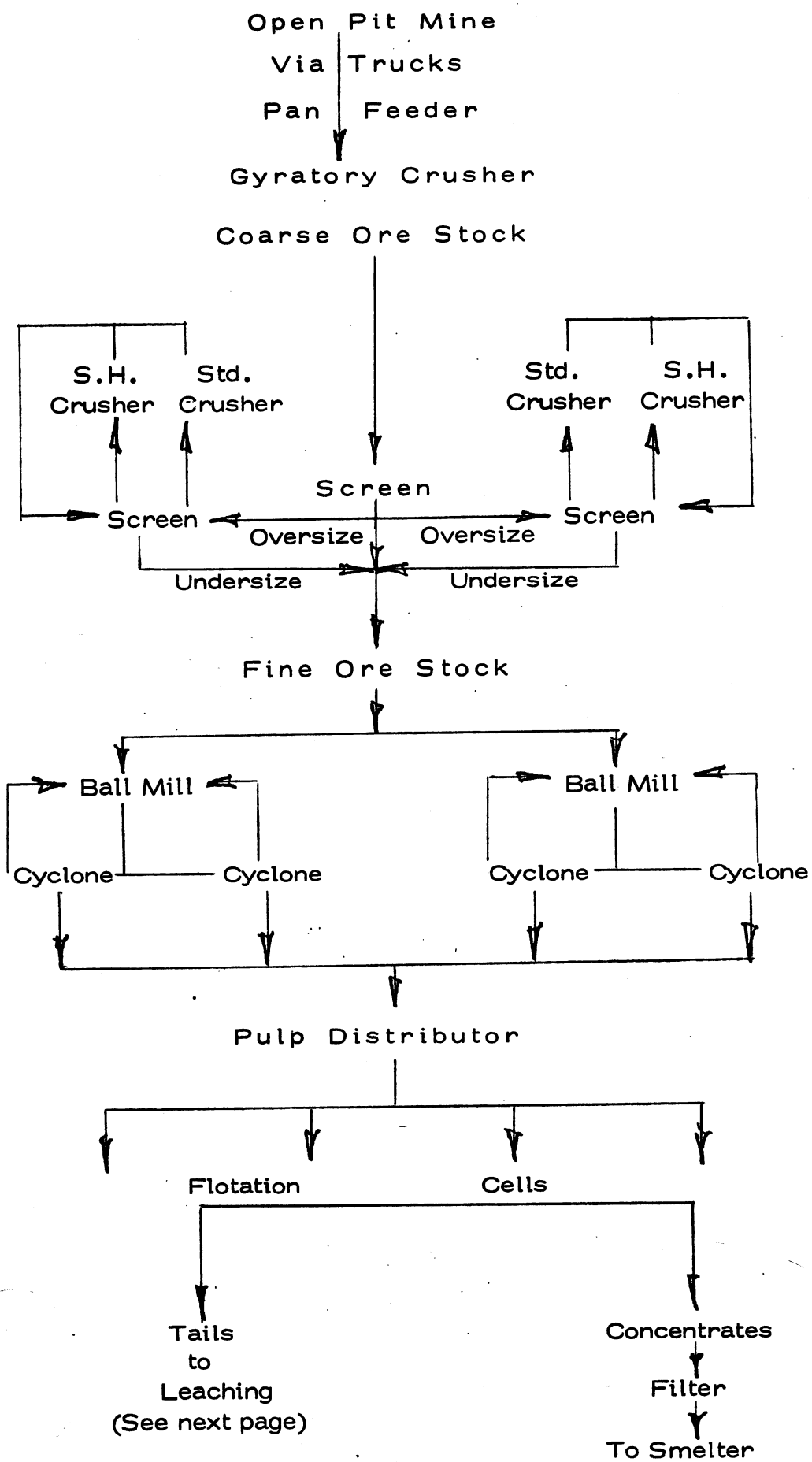
Fine ore will be reclaimed from the stockpiles at a rate of 5000 tons of ore per day, by means of tube feeders discharging directly to a variable speed conveyor. Each fine ore stockpile will feed a 10' diameter x 14' long ball mill. The ball mills will each be in closed circuit with two 20" Cyclone classifiers.

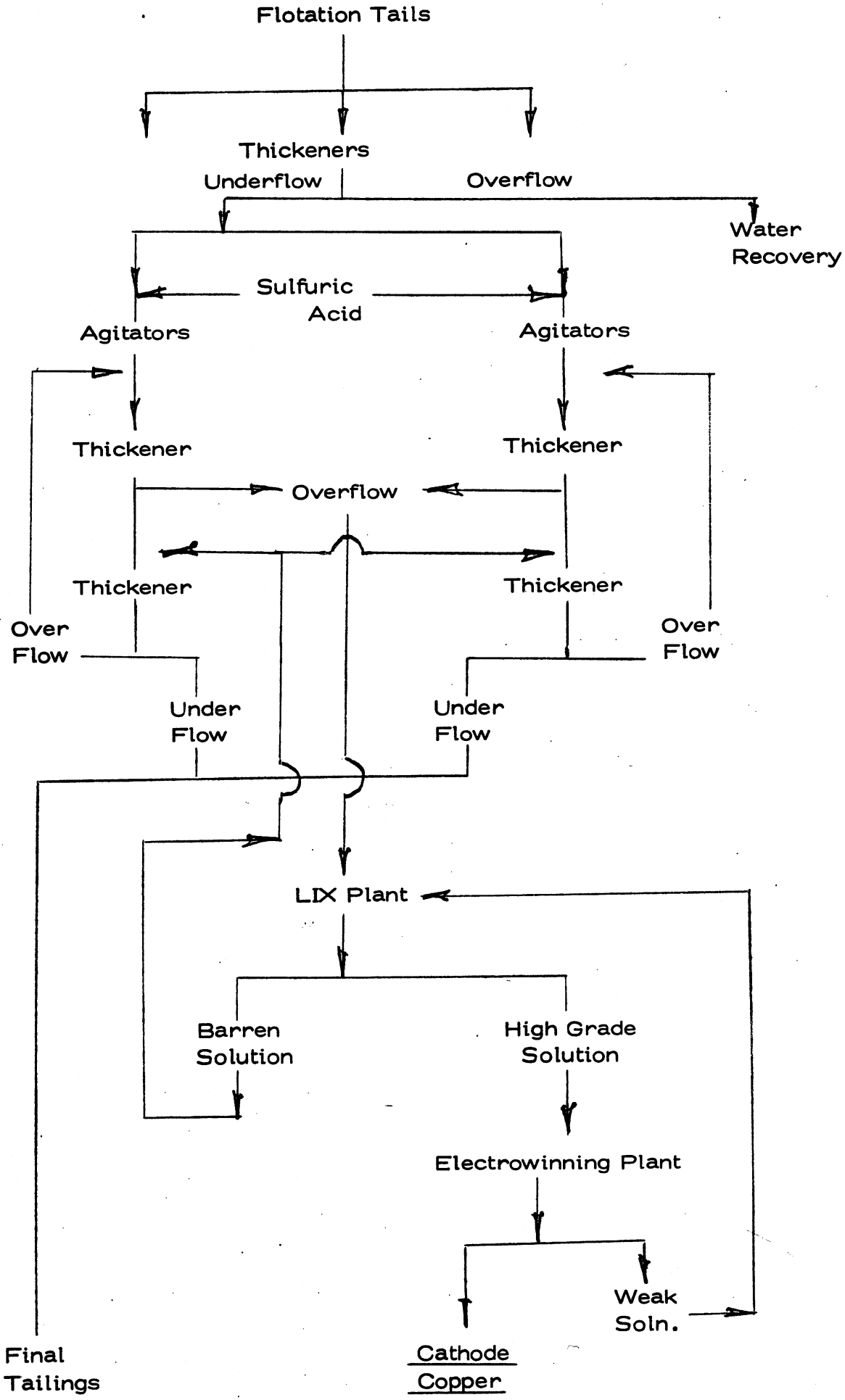
Flotation Circuit

The Cyclone overflow will be split by a pulp distributor to four 16 cell banks of flotation machines (Denver #30-100 or equivalent). Each bank of cells will be equipped with launders and feed pipes so that a finished cleaned concentrate may be produced by each bank.

SAN JUAN PROJECT

FLOW SHEET




Flotation Tails
Thickeners
Underflow
Overflow
Water Recovery
Sulfuric Acid
Agitators
Agitators
Thickener
Thickener
Overflow
Thickener
Thickener
Over Flow
Over Flow
Under Flow
Under Flow
LIX Plant
Barren Solution
High Grade Solution
Electrowinning Plant
Weak Soln.
Final Tailings
Cathode Copper

Reagent feeding facilities will be installed to measure and admit the proper reagents to the grinding and flotation circuits.

The cleaned concentrate will be pumped to a 30' diameter thickener which will operate in conjunction with a 6' diameter x 6 leaf American style filter situated above a concentrate bin so that trucks can be loaded by gravity directly from the bin.

The flotation tails at 20% solids will be split between three 100' diameter thickeners for water recovery and to increase the percent solids of the pulp for agitation leaching.

Leaching Circuit

The thickened flotation tails will be split between two rows, each of five 20' diameter x 20' deep acid proof agitators in series. Acid will be added to maintain a pH of 1.8. A contact time of six hours has been calculated. The agitator discharges will flow to two rows each of two 100' diameter thickeners in series. Pregnant solution will be taken from the first thickeners. Barren solution will be added to the last thickeners.

Thickened pulp from the last thickeners at 40-50% solids will be transferred to the tailings dam where limestone may be added to raise the pH to an acceptable level for reuse.

Copper Recovery

Pregnant solution at 3 grams copper per liter will be pumped to the solvent extraction circuit where a rich solution containing 40 grams copper per liter will be removed. The barren solution will be returned to the leaching circuit.

The rich solution will feed an electrolytic circuit where copper cathodes will be deposited using insoluble anodes. The low grade electrolyte, high in acid will return to the solvent extraction circuit. The capital costs and operating charges of the solvent extraction (LIX) circuit and the electrolytic circuit are estimated, for this report, to be similar to that installed at Bagdad Copper with a capacity of 20,000,000 pounds of copper per year.

Estimated Capital Expenditures

(aa) Acquisition, Exploration and Feasibility Study

It is estimated that the total cost of acquisition of the property, initial exploration and definitive feasibility study will be - $750,000

(a) Mining and Stripping Equipment
As estimated by D. Beling

Mine equipment	$ 1,719,000
Maintenance equipment	92,000
Mine office and shop building	128,000
Miscellaneous supplies and parts	200,000
	$ 2,139,000

(b) Stripping and Pit Preparation
As estimated by D. Beling

Labor (direct)	$ 230,000
Labor (indirect)	129,000
Fringe Benefits	57,000
Outside services	46,000
Supplies	275,000
Small tools	63,000
Gasoline and oils	25,000
	$ 825,000

(c) Plant Site and Roads

Site levelling and preparation	$ 10,000
Roads 10 miles @ $3,000/mile	30,000

Main Power Line and Terminal

Est. 8 miles of line @ $20,000/mile	160,000
Terminal building, transformers and switching equipment	250,000
Branch lines and transformers	150,000

Main Water Line, Wells & Pumps
(Assume no P-D water available)

Purchase of farm land	150,000
Wells, pumps, water line, storage tank, steady head tank for mill, fire protection	350,000
	$ 1,100,000

continued -

(d) Crushing Equipment and Installation

Foundation preparations		$ 50,000
Primary crusher	$250,000	
Installation	175,000	425,000
Two 5' secondary crushers	150,000	
Installation	75,000	225,000
Two 7¼ tertiary crushers	250,000	
Installation	150,000	400,000
One 6'x14' screen	15,000	
Installation	8,000	23,000
Two 5'x12' screens	30,000	
Installation	15,000	45,000
Pan feeder and bin	10,000	
Installation	5,000	15,000
Coarse ore conveyor	30,000	
Installation	15,000	45,000
Reclaiming tunnels		60,000
Stockpile conveyors	30,000	
Installation	15,000	45,000
Secondary crushing conveyors	30,000	
Installation	15,000	45,000
Fine ore conveyors	40,000	
Installation	20,000	60,000
Magnets		10,000
Dust collecting system		30,000
Mobile crane		15,000
Misc. water and air piping, fire protection		50,000
Steelwork (roof where required)		150,000
Power equipmtnt	250,000	
Installation	200,000	450,000
		$ 2,143,000

continued -

(e) Grinding Equipment and Installation

Two ball mill feeder belts	$ 15,000	
Plus installations	10,000	$ 25,000
Two scales and feed controls		20,000
Two 10'x 14' ball mills	400,000	
Installation	300,000	700,000
Four Cyclones	20,000	
Installation	10,000	30,000
Pulp pumps	30,000	
Installation	20,000	50,000
Power Equipment	350,000	
Installation	175,000	525,000
Crane	50,000	
Installation	25,000	75,000
Building and floors		100,000
		$ 1,525,000

(f) Flotation and Filtering Equipment & Installation

Pulp distribution		$ 20,000
Four banks flotation cells	$560,000	
Installation	280,000	840,000
One 30' conc. thickener	20,000	
Installation	10,000	30,000
One 6'x6 leaf filter inc. vacuum pump	30,000	
Installation	20,000	50,000
Concentrate bin	15,000	
Installation	10,000	25,000
Pumps	40,000	
Installation	20,000	60,000
Reagent feeding facilities		50,000
Three 100' thickeners	225,000	
Installation	75,000	300,000
Power Equipment	180,000	
Installation	180,000	360,000
Building		300,000
		$ 2,035,000

continued -

(g) Agitation and Washing Equipment & Installation

Acid storage tanks	$ 50,000	
Installation	20,000	$ 70,000
Ten agitators	250,000	
Installation	100,000	350,000
Four 100' thickeners	450,000	
Installation	250,000	700,000
Barren & preg. storage tanks		100,000
Pumps		250,000
Control equipment		20,000
Power equipment	180,000	
Installation	180,000	360,000
		$ 1,850,000

(h) LIX Plant, Electrolytic Recovery Plant & Installation

Data received from General Mills Corp. re Bagdad Copper Installation	
LIX plant	$ 1,500,000
Electrolytic plant	3,500,000
	$ 5,000,000

(i) Ancillary Buildings and Equipment

Administrative office and mine planning	$ 75,000	
Equipment	45,000	$ 120,000
Warehouse	100,000	
Equipment	30,000	130,000
Assay office	40,000	
Equipment	40,000	80,000
Shops	100,000	
Equipment	250,000	350,000
Change room and equipment		150,000
		$ 830,000

(j) Tailings Dam and Water Recovery System

Tailings dam		$ 100,000
Water return pumps	$ 20,000	
Installation	10,000	30,000
Water storage tanks	50,000	
Installation	20,000	70,000
		$ 200,000

Summary of Capital Expenditures

Item	Estimated Cost
Acquisition, Exploration and Feasibility Study	$ 750,000
Mining and Stripping Equipment	2,139,000
Stripping and Pit Preparation	825,000
Plant Site, Roads, Power and Water	1,100,000
Crushing Equipment and Installation	2,143,000
Grinding Equipment and Installation	1,525,000
Flotation and Filtering Equipment	2,035,000
Agitation and Washing Equipment	1,850,000
LIX Plant and Copper Recovery Plant	5,000,000
Ancillary Buildings and Equipment	830,000
Tailings Dam and Water Recovery	200,000
	$18,397,000

These expenditures will be depreciated by the straight line method over the ten year life of the property for the purposes of this preliminary study.

Sales Price of Copper

While the present price of cathode copper in the United States is 60 cents per pound, it was for many months in the past year in the 50 to 55 cents per pound area. There are curves which are said to predict the future price of copper, but these are subject to unknown factors such as the future rate of inflation, and the politics of major copper producing countries.

For this report we will calculate the income based on copper at 55, 60 and 65 cents per pound. We will also assume that the normal increase in costs of labor and materials over the ten year production period will be matched by an equivalent increase in the price of copper.

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ESTIMATED TIME AND EXPENDITURE SCHEDULE

In $000	YEAR - 3				YEAR - 2				YEAR - 1				
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	
Exploration - Metallurgical Work - Feasibility Study - Financing	150	250	250	100									
Construction Plans Order Equipment Roads, Sites - Power					500	300							
Mine Engineering							25	25					Start → Production
Construction					300	830	1000	1300	5000	3000	1000	1253	
Water - Tailings Dam									100	100			
Mine Equipment Pit Preparation								100	2039	52	323	400	
Total Expenditures	150	250	250	100	800	1130	1025	1425	7139	3152	1323	1653	$18,397

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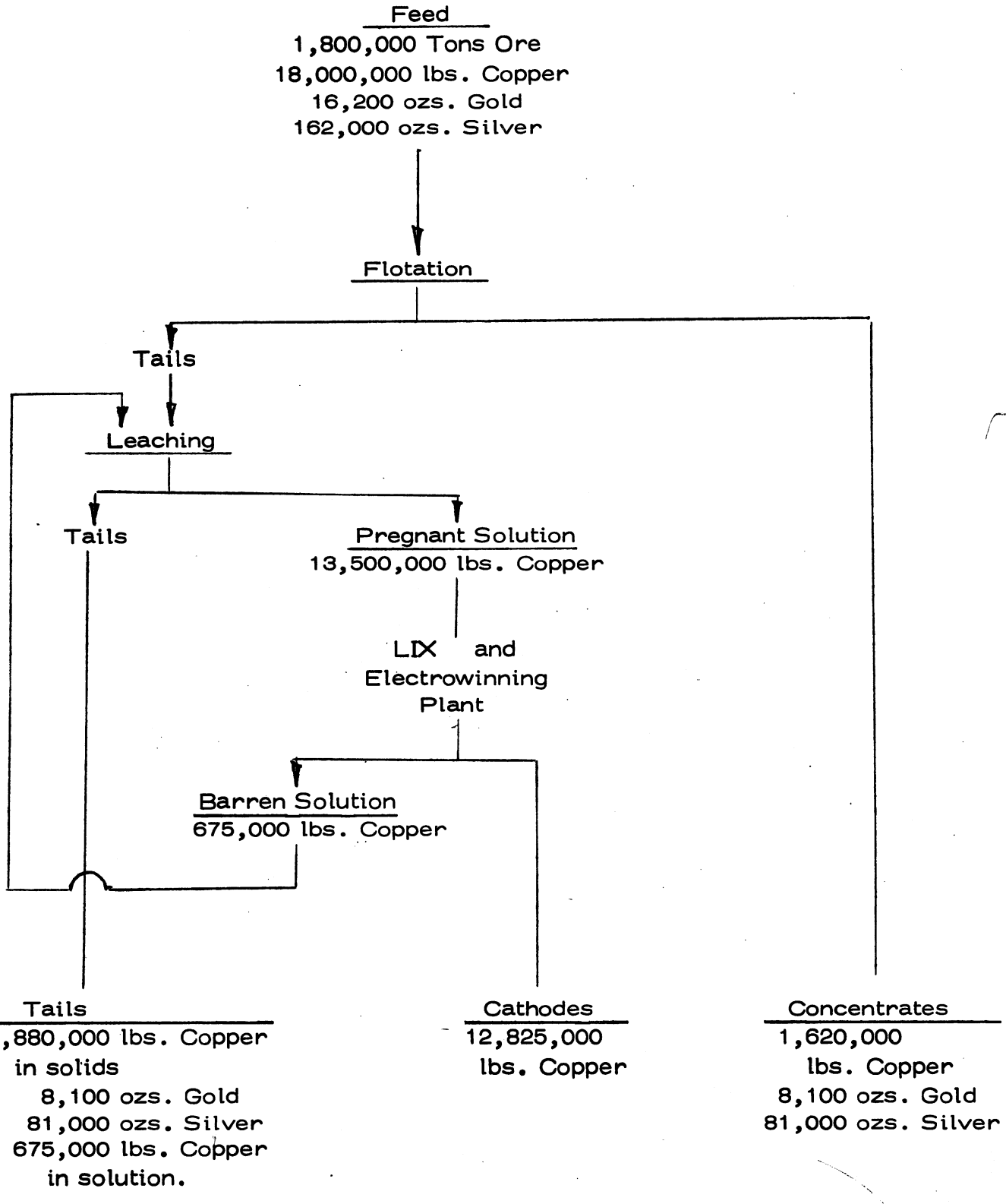
ESTIMATED PRODUCTION PER YEAR



Operating Costs

	Cost/Ton Treated in Cents
(a) Mining and stripping	
(Estimated by D. Beling)	
Direct labor	19.1
Indirect labor	5.8
Fringe benefits	5.5
Supplies	25.1
Maintenance supplies & services	10.0
	65.5¢
(b) Crushing	
Super.	0.9
Shift foremen	1.3
Workers 4 @ $850/mo.	1.6
Primary liners .05 lbs/T @ 32¢ lb.	1.6
Secondary & tert. liners .10 lbs. @ 50¢/lb.	5.0
Maintenance labor	1.6
Maintenance supplies	6.3
Power	2.8
	21.1¢
(c) Grinding and Flotation	
Super	0.9
Shift foremen (4)	2.7
Workers (8)	2.8
Balls 1.2#/T @ 15¢/lb.	22.5
Liners 0.08#/T @ 24¢/lb.	1.9
Pump & Cyclone parts	2.0
Reagents	20.0
Maintenance labor	2.0
Cell parts 0.5¢/T	0.5
Thickener parts	0.1
Filter parts & bags	0.3
Power	9.8
	65.5¢

continued -

(d) Leaching	Cost/Ton Milled
Supt.	0.9
Shift foremen (4)	2.7
Workers (4)	1.9
Acid 40#/T @ $15/T	30.0
Separan	1.0
Maintenance labor	2.0
Pump and other repair parts	1.0
Power	1.1
	40.6¢

(e) Copper Recovery

Bagdad = 3.7¢/lb. of copper cathode.
We will use 4.0¢/lb. for smaller capacity

12,825,000 x .04 ÷ 1,800,000 = 28.5¢

(f) Tailings Disposal and Water Recovery

Foreman	0.6
Workers (4)	2.7
Pump and other parts	1.0
Use of power shovel	1.5
Power	0.5
	6.3¢

continued -

(g) Administrative and General	Cost/Ton Milled
Shops	
Chief mechanic	0.9
Chief electrician	0.9
Mechanics, welders, electricians (10)	2.5
Supplies	1.0
Power	0.5
Assay Office	
Chief chemist	1.0
Technicians (5)	2.0
Supplies	0.1
Accountant's Office	
Chief accountant	0.9
Asst. (4) men or women	1.5
Warehouse	
Purchasing agent	0.9
Workers (2)	0.8
Administrative	
General Manager	3.0
General Supt. (Asst.)	2.0
Engineer and geologist	2.5
Water Supply	
Power	0.4
Supplies	0.1
	21.0¢

(h) Property Payments

Advance rentals for first 5 years after exercise of option to lease

	$100,000
less	7,750
	$ 92,250

which is a credit vs production royalties.

Production Royalties

4% of Gross Sales Revenue

Gross Sales Revenue is defined as total copper in concentrates sold at prevailing market price for electrolytic copper.

Total gold and silver in concentrates at prevailing market price for pure metals

Total cathode copper sold at prevailing market price for electrolytic copper

(i) Freight on Cathode Copper

We will use 4.0%/lb. for the freight on cathodes delivered to market.

Payment for Copper in Concentrates

Based on Copper at 60¢/lb.

Based on present Inspiration contract
2000 lbs. dry @ 40% copper
3.33 ozs. gold/ton
33.30 ozs. silver/ton

Copper - 60¢/lb - 7.75¢	=	52.25¢/lb.
Silver		2.50¢/oz.
Gold 80 x .92		73.60¢/oz.

Payments/Ton

Copper	800 lbs. less 4% = 768 lbs. @ 52.25	=	$401.28
Gold	3.33 ozs. @ 73.60		245.09
Silver	33.3 less 5% = 31.6 x 2.50		79.00
			$725.37

	Per Ton	
Less moisture penalty	1.00	
Excess metal values	2.50	
(725.37 - 40.00) .05 =	34.27	
Regular smelting charge	20.00	57.77
		$667.60
Less freight @ $10.00/ton est.		10.00
		$657.60

Value of copper content in concentrate after credit for gold and silver

Per pound $\frac{657.69}{800}$ = 82.2 cents per pound of copper

Estimated Net Income Year 1

Based on Copper at 60 cents/lb.

Gross Income		Dollars Per Year
Cathode copper - 12,825,000 lbs. @ .60		$7,695,000
Copper in concentrates (after credit for gold and silver) 1,620,000 lbs. @ .822		1,331,640
Total gross income		$9,026,640
Operating Costs		
Stripping and mining	65.5¢/T	$1,179,000
Crushing	21.1	379,800
Grinding and flotation	65.5	1,179,000
Leaching	40.6	730,800
Copper recovery	28.5	513,000
Tailings Disposal & water Rec.	6.3	113,400
Administrative and general	21.0	378,000
Freight on cathode copper @ 4¢/lb.		513,000
Royalty payments		380,700
Total operating costs		$5,366,700
Operating Profit		$3,659,940
Less depreciation		$1,839,700
depletion		910,120
		$2,749,820
Taxable Income		$ 910,120
Less federal and state taxes		$ 455,060
Net Income		$ 455,060
Net Cash Flow Year 1		$3,204,880

Estimated Net Income Year 1

Based on Copper at 55 cents/lb.

Gross Income	Dollars Per Year
Cathode copper - 12,825,000 lbs. @ .55	$7,053,750
Copper in concentrates (after credit for gold and silver) 1,620,000 lbs. @ .7764	1,257,768
Total gross income	$8,311,518
Total Operating Costs (less royalties)	$4,986,000
Plus royalties	351,810
Total operating costs	$5,337,810
Operating Profit	$2,973,708
Less depreciation	$1,839,700
depletion	567,004
	$2,406,704
Taxable Income	$ 567,004
less federal and state taxes	$ 283,502
Net Income	$ 283,502
Net Cash Flow Year 1	$2,690,206

Estimated Net Income Year 1

Based on Copper at 65 cents/lb.

	Dollars Per Year
Gross Income	
Cathode copper - 12,825,000 lbs. @ .65	$8,336,250
Copper in concentrates (after credit for gold and silver) 1,620,000 lbs. @ .8676	1,405,512
Total gross income	$9,741,762
Total Operating Costs less royalties	$4,986,000
Plus royalties	409,590
Total operating costs	$5,395,590
Operating Profit	$4,346,172
Less Depreciation	$1,839,700
Depletion	1,253,236
	$3,092,936
Taxable Income	$1,253,236
Less federal and state taxes	626,618
Net Income	$ 626,618
Net Cash Flow Year 1	$3,719,554

Discounted Cash Flow

Based on Copper at 60 cents/lb.

For this calculation the discounted cash flow represents the average annual rate of compound interest at which the investment in the project is expected to be recovered through the cash generated by the project.

Year	Net Cash Flow	10% Discount	15% Discount
1	$3,204,880	$ 2,913,235	$ 2,785,040
2	"	2,647,230	2,422,889
3	"	2,406,864	2,105,606
4	"	2,188,933	1,829,986
5	"	1,990,230	1,592,825
6	"	1,807,552	1,384,508
7	"	1,644,103	1,201,830
8	"	1,496,678	1,044,790
9	"	1,358,869	910,185
10	"	1,237,083	791,605
		$19,690,777	$16,069,264
Investment		18,397,000	18,397,000
		$ 1,293,777	($ 2,327,736)

Interpolating $10 + 5 \frac{1293}{3620}$

DCF = 11.78%

Similar calculations based on copper valued at 55 and 65 cents per pound gave D.C.F. values of 7.57% and 16.12% respectively.

The relationship between the price of copper and the D.C.F. is illustrated on the graph on the following page. It will be noted that at 58 cents per pound for copper the D.C.F. is 10%.

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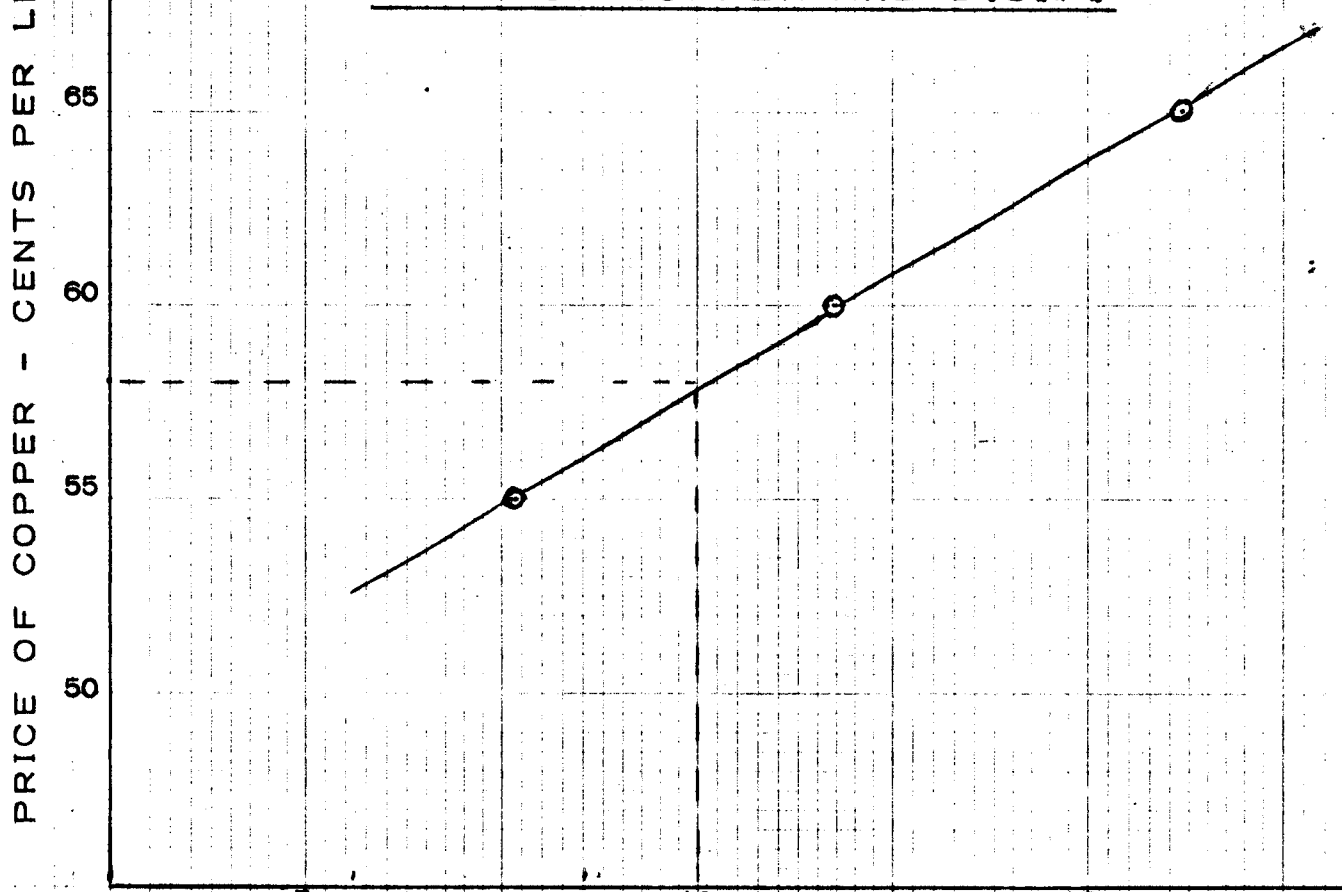
Lyall J. Licht

SAN JUAN PROJECT

GRAPH SHOWING RELATION BETWEEN

PRICE OF COPPER AND D.C.F.