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SOCIETY OF MINING ENGINEERS
of AIME
345 EAST 47TH STREET, NEW YORK 17, N.Y.

SOCIETY OF MINING ENGINEERS AIME

# HEAP LEACHING COPPER ORE AT RANCHERS BLUEBIRD MINE
# MIAMI, ARIZONA

Arthur Miller
Vice President

Ranchers Exploration and
Development Corporation
Albuquerque, New Mexico

sep. 11

This paper is to be presented at the SME Fall Meeting-Rocky Mountain Minerals Conference, Las Vegas, Nevada, September 6-8, 1967

## INTRODUCTION

Most of the production of copper in the United States comes from a few large companies. Often overlooked, however, are the more numerous small mining operations, which collectively produce a significant portion of the nation's copper.

The objective of this paper is to describe the operations of a small mining company - Ranchers Exploration and Development Corporation - how it views its place in this industry of giants, how it exploits the advantages offered by its relatively small size, and how it protects itself from the hazards being small introduces.

Environment is, of course, a critical factor for such a company because it does not have the resources which help large companies weather periods of financial stress. Ideally, this environment is characterized by a healthy economy, strong product demand, relatively stable prices, adequate grades and tonnages of ore commensurate with depth and overburden, ready access to utilities, a dependable labor pool, and suitable technical "know how".

When the environment is right, properties which were previously uneconomical to operate attract the attention of companies whose primary interest is a return on investment commensurate with risk over a reasonable period of time. Naturally, the amount of the investment and the duration of operation determines the size of the company which would be interested in such a venture.

Such is the case with Ranchers Bluebird Mine at Miami, Arizona - a small property operated by a small company in a favorable economic environment.

## SUMMARY AND CONCLUSION

Ranchers began its evaluation of the Bluebird Mine in late 1963. The property which included some 400 acres, adjoined one of the country's leading producers - Inspiration Consolidated Copper Company. Such proximity led many to equate availability with undesirability. However, a relatively short period of exploration and metallurgical evaluation and a simultaneous assessment of other environmental elements led Ranchers to acquire the property and to expand its operation. The objective: steady, continuous production, at a substantial level. The property was to become one of the first medium-sized copper mining operations to rely solely upon heap leaching as a means of production. Previously, leaching of copper had been confined largely to waste dumps, which do not carry with them the burden of mining costs, or to vats in which higher grade ores are treated and where control of leaching and recovery is more precise.

344-3124

January 11, 1971 - Alb., N.M.
Ranchers Exploration and Development Corp.
Milt Ward, V.P. - Maxie Anderson. Pres

Send annual reports

45,000 lbs/day almost immediately

After expansion
160 to 200,000 lbs/day 2/1 stripping ratio

No decision on leaching methods.

Expansion $35,000,000

Acid 1971 $30 ton
1972 $15 ton + $2 delivery

"in three years, acid at $5"

No problem on border line.

Rancher's will strip & pay all costs"
Contribution
① Essex will do some further exploration drilling
4-5 holes 1000'

Option basis
4-6 month

② Essex will ~~[illegible]~~ pay for ~~[illegible]~~ engineering and metallurgical studies. + pilot study?
$100 - $200,000

~~③ Ranchers Selling 20% interest in property~~

344
3521

4.

20% Equity 10 million

18 month.

Balance of financing 35.8 million
~~25 million~~ - 6.5 from sale of equity
29.3

Essex will furnish or obtain financing of 29.3 million

Maxie estimates 7-10 year pay on finance money.

71 38¢ Cu 72 32¢ Cu

Example
Income 12 million/year
20% 2.4 million

Essex can have 1st refusal on Cu if negotiate all this price - Maxie Anderson's price
LME - Comex price -

Essex will not participate until expansion is complete. Then its 20% of everything.

Joint venture with ~~Bluebird~~ Ranchers. only on Bluebird.

Non-union - mine - Maxie's dad
~~Mill~~ Leaching plant - union contract - Steelworkers.
Bonus system - lbs of Cu @ No. of men working

Talk again 2nd week of February

Target negotiations Mid - 72

4.

Send PC paper to Geologist

(Canadian Mining Costs Book for Ward)

Bluebird — 5 months Cu cost

| | | 71 | 72 (Nov 71) | | |
|---|---|---|---|---|---|
| Current Costs | | 38¢ | $32 | | |
| Stripping Ratio | 1/1 | current | | start 1.2/1 | overall 2/1 |
| Mining Costs | 22-24¢ ton material | | | | |

Leaching Cost lb Cu

| | | | | | |
|---|---|---|---|---|---|
| Acid | 6½ - 5½ ¢ | | projecting 4¢ | | |
| other | .024 | 5 months Nov 71 | .029 | 5 months 1971 | |

Solvent extraction

| | | | | |
|---|---|---|---|---|
| Solvent | .0226 | .017¢ lb. | projecting | .008¢ |
| other | .0279 | .0279¢ | | |

Copper winning

| | 71 | 72 |
|---|---|---|
| Starter sheets | .0033 | .0094¢ |
| Power | .013 | .012¢ |
| other | .0276 | .022 |

| | | |
|---|---|---|
| Lab expense | .0052 | .0051 |
| Gen Ad. | .0251 | .0261 |

3/24/70

FILE MEMO –

SUBJECT : VISIT TO RANCHERS – BLUEBIRD MINE.

VISITED RANCHERS BLUEBIRD MINE NEAR MIAMI ARIZONA WITH CLYDE OSBORNE ON 3/24/70. RANCHERS EXPLORATION & DEVELOPMENT CORP LOCATED IN ALBUQUERQUE N.M (505 344-3542) IS HEADED BY:

MAX ANDERSON – PRESIDENT
MILTON WARD – GEN'L MGR.

THE BLUEBIRD MINE @ MIAMI IS HEADED BY:

KENNETH L. POWERS – MANAGER
DICK STRAND – MINE SUPT.
LAMAR O. KINNARD – EXTRACTION PLANT SUPV.

THE PURPOSE OF THE VISIT WAS TO EVALUATE THE EFFECTIVENESS OF THE LIX PROCESS FOR RECOVERING COPPER FROM LEACH SOLUTIONS.

OBSERVATIONS OF THE OPERATION WERE AS FOLLOWS:

MINING

THE ORE DEPOSIT IS PRINCIPALLY CHRYSOCOLLA ($CuSiO_3 \cdot 2H_2O$), MALACHITE ($Cu_2(OH) \cdot CO_3$) AND AZURITE ($Cu_3(OH)_2 \cdot (CO_3)_2$). THE ORE IS IN VEIN BUT THE OPEN CUT OPERATION IS SCHEDULED TO GIVE AN AVG BLEND CONTAINING 0.5% Cu, THE CUT-OFF POINT IS 0.2%. NORMAL MINING RATE IS 15,000 TPD WITH A 1 TO 1 STRIPPING RATIO. CURRENTLY THEY ARE RUNNING 20-22,000 TPD.

TWELVE SCRAPERS ARE USED TO BREAK & LOAD THE ORE. NO BLASTING IS NECESSARY. THE NORMAL MANPOWER COMPLEMENT IS 20-24 MEN. THIS IS JUST FOR MINING TO THE LEACH HEAPS. MINING OPERATIONS ARE SCHEDULED 5 DAYS/WEEK.

# EXTRACTION PLANT.

Geologic Ore Reserves

** OCTOBER 20, 1971 ** BLUEBIRD MINE MODEL.
DISTRIBUTION TYPE = 1 NORM

ALL BLOCKS

Ignore

| ASSAY INTERVAL | (1) FREQ. | (2) Above TOTAL | PCT. | (4) GRADE | Standard DEV. | GRADE-CI | GRADE+CI | INT | |
|---|---|---|---|---|---|---|---|---|---|
| .050-- .100 | 1584. | 13703. | 100.00 | .370 | .264 | .365 | .374 | TOTL | 1 |
| .100-- .150 | 1293. | 12119. | 88.44 | .409 | .256 | .404 | .413 | TOTL | 2 |
| .150-- .200 | 1058. | 10826. | 79.00 | .443 | .250 | .438 | .448 | TOTL | 3 |
| .200-- .250 | 1044. | 9768 | (3) 71.28 | .472 | .246 | .467 | .477 | TOTL | 4 |
| .250-- .300 | 1002. | 8724. | 63.66 | .502 | .244 | .497 | .507 | TOTL | 5 |
| .300-- .350 | 1485. | 7722. | 56.35 | .531 | .245 | .525 | .536 | TOTL | 6 |
| .350-- .400 | 1328. | 6237. | 45.52 | .580 | .248 | .574 | .586 | TOTL | 7 |
| .400-- .450 | 936. | 4909. | 35.82 | .636 | .252 | .629 | .643 | TOTL | 8 |
| .450-- .500 | 798. | 3973. | 28.99 | .686 | .255 | .678 | .694 | TOTL | 9 |
| .500-- .550 | 602. | 3175. | 23.17 | .740 | .260 | .731 | .749 | TOTL | 10 |
| .550-- .600 | 666. | 2573. | 18.78 | .790 | .264 | .780 | .800 | TOTL | 11 |
| .600-- .650 | 286. | 1907. | 13.92 | .865 | .269 | .853 | .877 | TOTL | 12 |
| .650-- .700 | 258. | 1621. | 11.83 | .908 | .270 | .895 | .921 | TOTL | 13 |
| .700-- .750 | 192. | 1363. | 9.95 | .952 | .272 | .938 | .967 | TOTL | 14 |
| .750-- .800 | 204. | 1171. | 8.55 | .990 | .276 | .974 | 1.005 | TOTL | 15 |
| .800-- .850 | 170. | 967. | 7.06 | 1.035 | .284 | 1.017 | 1.053 | TOTL | 16 |
| .850-- .900 | 219. | 797. | 5.82 | 1.079 | .294 | 1.059 | 1.100 | TOTL | 17 |
| .900-- .950 | 105. | 578. | 4.22 | 1.157 | .312 | 1.132 | 1.183 | TOTL | 18 |
| .950-- 1.000 | 473. | 473. | 3.45 | 1.209 | .322 | 1.180 | 1.238 | TOTL | 19 |

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(2) Above end gr[…] member of bl[…] (blksx[…] to get at 12[…]

(3) 71.28 [...] blocks run .[…] run .2[…]

(4) Average of ma[…] above end g[…] member[…]

Geologic Ore Reserves

** OCTOBER 20, 1971 ** BLUEBIRD MINE MODEL.
DISTRIBUTION TYPE = 1 NORM

ALL BLOC

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|---|---|---|---|---|---|---|---|---|---|
| .050-- .100 | 1584. | 13703. | 100.00 | .370 | .264 | .365 | .374 | TOTL | 1 |
| .100-- .150 | 1293. | 12119. | 88.44 | .409 | .256 | .404 | .413 | TOTL | 2 |
| .150-- .200 | 1058. | 10826. | 79.00 | .443 | .250 | .438 | .448 | TOTL | 3 |
| .200-- .250 | 1044. | 9768 | 71.28 (3) | .472 | .246 | .467 | .477 | TOTL | 4 |
| .250-- .300 | 1002. | 8724. | 63.66 | .502 | .244 | .497 | .507 | TOTL | 5 |
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| .500-- .550 | 602. | 3175. | 23.17 | .740 | .260 | .731 | .749 | TOTL | 10 |
| .550-- .600 | 666. | 2573. | 18.78 | .790 | .264 | .780 | .800 | TOTL | 11 |
| .600-- .650 | 286. | 1907. | 13.92 | .865 | .269 | .853 | .877 | TOTL | 12 |
| .650-- .700 | 258. | 1621. | 11.83 | .908 | .270 | .895 | .921 | TOTL | 13 |
| .700-- .750 | 192. | 1363. | 9.95 | .952 | .272 | .938 | .967 | TOTL | 14 |
| .750-- .800 | 204. | 1171. | 8.55 | .990 | .276 | .974 | 1.005 | TOTL | 15 |
| .800-- .850 | 170. | 967. | 7.06 | 1.035 | .284 | 1.017 | 1.053 | TOTL | 16 |
| .850-- .900 | 219. | 797. | 5.82 | 1.079 | .294 | 1.059 | 1.100 | TOTL | 17 |
| .900-- .950 | 105. | 578. | 4.22 | 1.157 | .312 | 1.132 | 1.183 | TOTL | 18 |
| .950-- 1.000 | 473. | 473. | 3.45 | 1.209 | .322 | 1.180 | 1.238 | TOTL | 19 |

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FEB 18 1972

**avoid verbal orders**

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Make Copy to Return

**TO** P. Eimon **LOCATION** Tucson, Arizona

**FROM** G. Jackson **LOCATION** Tucson, Arizona

**SUBJ.** Essex/Bluebird Proposal **DATE** February 16, 1972

**COPY TO**

SXM

FEB 23 1972

RECEIVED

A pro-forma cash flow model was developed for a proposed Essex-Ranchers joint venture on the Bluebird Mine, Miami, Arizona. The basic assumptions are attached but show an investment proposal by Ranchers for an initial capital investment by Essex of $10 million for 20% interest. They would also require Essex to spend up to $200,000 additional for test work during an initial six months option period.

It is assumed that a coarse grind-agitation leach plant with LIX electrowinning would be constructed to produce about 187,500 lbs. of Cu daily from 25,000 TPD heads assaying .472% Cu. The mine would have an 11 + year life and about a 2 to 1 stripping ratio.

Ranchers estimates total capital requirements at about $35.8 million of which $6.5 million would come from Essex (thus pocketing $3.5 million) and the remainder of $29.3 million would be borrowed with Essex's assistance.

The cash flow indicated a return on investment of about 9% on a discounted cash flow basis for the total project. Essex's investment of $10.2 million plus an additional $1.2 million as our share (20%) of the working capital, indicated a return of only about 5% on a discounted cash flow basis.

Neither return on investment is too attractive and present offerings by Ranchers should be rejected.

Gustavo

G.E. Jackson
attachment

cc: H. Lanier

PAUL - IS IT WORTH EVALUATING AN ALTERNATE PROPOSAL - SAY FOR A 49% EQUITY FOR $ ? SHOULD WE COUNTER ?

H 2/20

# ESSEX/BLUEBIRD MINE

# RANCHERS PROPOSAL

# AGITATION LEACH/LIX-EW

Basic Assumptions:

| | |
|---|---|
| Tons | 97,680,000 S.T. Ore |
| Grade | .472% Cu @ .20% Cu cutoff |
| % Recovery | Assume 80% |
| Lbs. Cu recovered per ton ore | 7.5 lbs. |
| Tons ore treated per day | 25,000 S.T. |
| Lbs. Cy recovered per day | 187,500 lbs/day |
| Lbs. Cu recovered per year | 65,625,000 lbs |

Capitalization - Total @ $35,800,000
Essex put up $10,000,000 for 20% share ($6.5 million actual)
Help raise additional $29,300,000
Option period - 6 mo. (spend additional $200,000 then).

Costs

Mining - S/R @ 2:1
Assume cost @ .25/ton material
Mining costs @ .75/ton ore or $.10/lb. Cu

| | |
|---|---|
| Milling - Assume | .20/lb. Cu |
| Admin. - Assume | .025 |
| Total | $.325/lb. Cu |

Cost per year - $21,300,000

Income - EW Cu @ 51.5¢ lb.
Minus 1.5¢ discount for net price - .50/lb.
Income per year - $32,800,000

Depreciation - $35,800,000
10 yr. - straight line - $3,580,000/yr.

Taxes @ 53%

Depletion - 50% of net up to $4,920,000/yr.

May 4, 1971

TO: H. Lanier

FROM: C.K. Chase

SUBJECT: REPORT NO. MET. 71-5-5
Visit to Ranchers Exploration and Development Co. Bluebird Mine on Friday, April 30, 1971.
Tour Guide - K.L. Power, Mgr.

Although the Ranchers plant was designed for a production rate of 15 TPD of cathodes, the rate has recently been as high as 20 TPD. This was attained by leaching some high grade ore and raising the amperes per square foot in the tankhouse to 23 from the usual 15 or so.

Normal irrigation rate on the heaps is 200 gpm per 60,000 square feet. An attempt is being made to slow this down to 200 gpm per 90,000 sq. ft. in order to raise copper content of pregnant liquor (to raise production without increasing flowrate beyond current levels). The design of the LIX plant was originally for 933 gpm but they are currently running 1500 gpm aqueous. This was necessary because the grade of pregnant solution has fallen from 4 to 5 gpl to 2.2 gpl Cu currently and an increase in flowrate was necessary to maintain production. The raffinite, using LIX64N, is usually 0.25 gpl Cu.

The current ore runs 0.5% Cu, with a cut-off that must be about 0.25% Cu. The mining rate for ore is 8000 TPD which means that 80,000 pounds of copper is being put on the leach lifts each day. Since daily copper production averaged 32,000 a day for a long time, this means a running extraction of $\frac{32,000}{80,000} = 40\%$.

At Ranchers there is no deliberate bleed of solutions but evaporation, soakage into new ore, and possibly some seepage into the compacted ground under the lifts make necessary a make-up of about 8 to 10% of the leach flowrate. Most of the make-up is from stored run-off from rains.

Electrolytic current efficiency at Ranchers has improved from 77% to 89%, mostly as a result of elimination of internal shorts in the tanks. Current used in precipitating the copper averages 1.1 KWH per pound of copper.

The LIX section was designed for a total flow of 3733 gpm aqueous plus organic. To increase the copper handling capabilities of this section, LIX percentage has been raised from 5½ to 8%.

A new heap is started leaching every 15 days. Average life of a heap is 135 days. Solution comes through 4 or 5 lifts on top of each other in one week to ten days but when 10 lifts are on top of each other, 45 days may be necessary between beginning of irrigation and appearance of dump underflow (preg.).

The anodes in current use are 10% Sb, 0.3% As, and are of perforated grid construction. The tankhouse contains 48 cells. Eight cells are therefore pulled each day for the customary 6-day sheet which weighs from 100 to 125 pounds. Each cell has 41 anodes and 40 cathodes and current density is between 15 and 22 amps per square foot. All 48 cells are operated in parallel for solution flow. The overall voltage is 96, so each cell has $\frac{96}{48} = 2$ volts drop across it.

The stripping circuits and the electrolyte circuits join in a common tank in a figure-8 configuration. This allows independent flowrates in the stripping section and the tankhouse section, as may be desirable according to circumstances. This flexible circuit is a recent modification in response to a felt need. The loaded organic runs 1.3 gpl Cu and it is stripped down to 0.15 gpl Cu.

The following table shows some circuit assays over a 7-month period:

| Month | GPL $H_2SO_4$, Feed | GPL Cu, Feed | GPL Cu, Raffinate |
|---|---|---|---|
| Oct. '70 | 5.7 | 2.39 | 0.38 |
| Nov. | 4.8 | 2.28 | 0.16 |
| Dec. | 5.2 | 2.23 | 0.14 |
| Jan. '71 | 5.4 | 2.25 | 0.18 |
| Feb. | 4.1* | 2.16 | 0.11 |
| Mar. | 4.5 | 2.27 | 0.18 |
| Apr. | 4.8 | 2.39 | 0.30 |

*Plant designed for 4 GPL $H_2SO_4$.

Ranchers had their transformer for precipitating copper burn out and it put them out of production for a week. Later they bought a spare transformer and, subsequently, they burned out two in one day. At the time, these burnouts were of undetermined cause. By now it has been determined that the burnouts were due to acid mist from the tankhouse entering the air cooling system of the transformers It appears that either the transformers should be distant from the acid mist or that an oil cooled transformer should be used to avoid this problem.

Each silicon rectifier is protected by a fusible link against shorts. There are 132 such rectifiers at the plant.

The manpower to run the plant is:

| | |
|---|---|
| Mine - | 32 men including foreman |
| Plant - | 45 men |
| Salary - | 11 men |
| | 88 total |

C.K. Chase

CKC:td

2-16-71
G.I.

# SX / Bluebird

Grind - Leach - Lix - EW

Mill - 25,001 TPD - 350 D/Yr.

Mill - 8,750,001 TPY - Life of Mine - 10 Yrs.

80% Recovery

Recover - 7.5 lb/T

Sell - 65,625,000 lb/Yr.

| Yr. | 1972 6 mo. | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1982 | 1983 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Copper Production M lb | — | — | — | 65.625 | 65.625 | 65.625 | 65.625 | 65.625 | 65.625 | 65.625 | 65.625 | 65.625 | 65.625 |
| Capital Investment ($ x 1000) | | | | | | | | | | | | | |
| Testing | 200 | | | | | | | | | | | | |
| Buy 25% Interest | 10000 | | | | | | | | | | | | |
| Plant Construction | | 15000 | 14300 | M Start | | | | | | | | | |
| Working Cap | | | | 6000 | | | | | | | | | |
| Economic Evaluation | | | | | | | | | | | | | |
| Gross Income - Sale Cu @ .50/lb | — | — | — | 32800 | 32800 | 32800 | 32800 | 32800 | 32800 | 32800 | 32800 | | |
| Less Oper Costs | — | | | (21300) | (21300) | (21300) | (21300) | (21300) | (21300) | 21300 | (21300) | | |
| " Interest (8%) | | (816) | (2081) | (3392) | (3319) | (2762) | (2172) | (1548) | (887) | (187) | — | | |
| " Depreciation | | | — | (3580) | (3580) | (3580) | (3580) | (3580) | (3580) | (3580) | (3580) | | |
| Operating Profit (Loss) | | (816) | (2081) | 4528 | 4601 | 5158 | 5748 | 6372 | 7033 | 7733 | 7920 | | |
| Less Depletion | | — | — | (2264) | (2300) | (2579) | (2874) | 3186 | 3516 | 3866 | 7920 | | |
| Net Before Taxes | | (816) | (2081) | 2264 | 2301 | 2579 | 2874 | 3186 | 3517 | 3867 | 3960 | | |
| Income Tax @ 53% | | — | — | 1200 | 1219 | 1367 | 1523 | 1689 | 1864 | 2049 | 2099 | | |
| Net Profit | | (816) | (2081) | 1064 | 1082 | 1212 | 1351 | 1497 | 1653 | 1818 | 1861 | 1861 | 1861 |
| Essex Share - 20% | | (163) | (416) | 906 | 920 | 1032 | 1150 | 1274 | 1407 | 1547 | 1584 | 1584 | 1584 |
| Essex Depletion | | — | — | 453 | 460 | 516 | 575 | 637 | 703 | 774 | 792 | 792 | 792 |
| Essex Net Before Taxes | | (163) | (416) | 453 | 460 | 516 | 575 | 637 | 704 | 773 | 792 | 792 | 792 |
| Essex Tax @ 53% | | 86 | 220 | 240 | 244 | 273 | 305 | 338 | 373 | 410 | 420 | 420 | 420 |
| Essex Net Profit | | (77) | (196) | 213 | 216 | 243 | 270 | 299 | 331 | 363 | 372 | 372 | 372 |
| Cash Flow - Total Project | | | | | | | | | | | | | |
| Net Earnings (Loss) | | (816) | (2081) | 1064 | 1082 | 1212 | 1351 | 1497 | 1653 | 1818 | 1861 | | |
| Add Depreciation | | — | — | 3580 | 3580 | 3580 | 3580 | 3580 | 3580 | 3580 | 3580 | | |
| " Depletion | | — | — | 2264 | 2300 | 2579 | 2874 | 3186 | 3516 | 3866 | 3960 | | |
| Less Capital Investment | (10200) | (15000) | (14300) | — | — | — | — | — | — | — | — | | |
| " Working Capital | | | | (6000) | — | — | — | — | — | — | — | | |
| Cash Flow In (Out) | (10200) | (15816) | (16381) | 908 | 6962 | 7371 | 7805 | 8263 | 8749 | 9264 | 9401 | 9401 | 9401 |
| Cum. Cash Flow In (Out) | (10200) | (26016) | (42397) | (41489) | (34527) | (27156) | (19351) | (11088) | (2339) | 6925 | 16326 | 25727 | 35128 |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| ROI - Total | 10% | 8% | 6% | 9.2% | | | | | | | | | |
| | 36585 | 42075 | 39211 | | | | | | | | | | |
| | 38116 | 38889 | 38501 | | | | | | | | | | |
| SX Share - Cash Flow | | | | | | | | | | | | | |
| Cash Flow Essex - In (Out) | (10200) | (77) | (196) | 182 | 1392 | 1475 | 1561 | 1652 | 1750 | 1853 | 1880 | 1880 | 1880 |
| Cum Cash Flow - In (Out) | (10200) | (10277) | (10473) | (10291) | (8899) | (7424) | (5863) | (4211) | (2461) | (608) | 1272 | 3152 | 5032 |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

RoI — SX

| | | | | |
|---|---|---|---|---|
| 10% | 8% | 6% | 7% | 5% |
| 7317 | 8415 | 9726 | 9108 | 10476 |
| 10432 | 10439 | 10447 | 10443 | 10451 |

| | |
|---|---|
| P. Eimon | Tucson, Arizona |
| G. Jackson | Tucson, Arizona |
| Essex/Bluebird Proposal | February 16, 1972 |

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G.E. Jackson
attachment

# ESSEX/BLUEBIRD MINE

## RANCHERS PROPOSAL

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Basic Assumptions:

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| Tons | 97,680,000 S.T. Ore |
| Grade | .472% Cu @ .20% Cu cutoff |
| % Recovery | Assume 80% |
| Lbs. Cu recovered per ton ore | 7.5 lbs. |
| Tons ore treated per day | 25,000 S.T. |
| Lbs. Cy recovered per day | 187,500 lbs/day |
| Lbs. Cu recovered per year | 65,625,000 lbs |

Capitalization - Total @ $35,800,000

Essex put up $10,000,000 for 20% share ($6.5 million actual)

Help raise additional $29,300,000

Option period - 6 mo. (spend additional $200,000 then).

Costs

Mining - S/R @ 2:1

Assume cost @ .25/ton material

Mining costs @ .75/ton ore or $.10/lb. Cu

| | |
|---|---|
| Milling - Assume | .20/lb. Cu |
| Admin. - Assume | .025 |
| Total | $325/lb. Cu |

Cost per year - $21,300,000

Income - EW Cu @ 51.5¢ lb.

Minus 1.5¢ discount for net price - .50/lb.

Income per year - $32,800,000

Depreciation - $35,800,000

10 yr. - straight line - $3,580,000/yr.

Taxes @ 53%

Depletion - 50% of net up to $4,920,000/yr.

# SPEED MEMO

To Howard Lanier | At Fort Wayne

Subject Ranchers Bluebird Mine | Date 2/17/72

Based on Guerdon's analysis, I will contact Maxie tactfully saying more attractive terms would be necessary to continue Essex interest in the Bluebird.

**PLEASE REPLY TO** Signed Paul Eimon | At Tucson

Date | Signed

**REPLIER—RETAIN FOR YOUR FILES**

Form No. X-114 F.W.P.

avoid verbal orders

avo

| | | | |
|---|---|---|---|
| TO | P. Eimon | LOCATION | Tucson, Arizona |
| FROM | G. Jackson | LOCATION | Tucson, Arizona |
| SUBJ. | Essex/Bluebird Proposal | DATE | February 16, 1972 |

COPY TO

A pro-forma cash flow model was developed for a proposed Essex-Ranchers joint venture on the Bluebird Mine, Miami, Arizona. The basic assumptions are attached but show an investment proposal by Ranchers for an initial capital investment by Essex of $10 million for 20% interest. They would also require Essex to spend up to $200,000 additional for test work during an initial six months option period.

It is assumed that a coarse grind-agitation leach plant with LIX electrowinning would be constructed to produce about 187,500 lbs. of Cu daily from 25,000 TPD heads assaying .472% Cu. The mine would have an 11 + year life and about a 2 to 1 stripping ratio.

Ranchers estimates total capital requirements at about $35.8 million of which $6.5 million would come from Essex (thus pocketing $3.5 million) and the remainder of $29.3 million would be borrowed with Essex's assistance.

The cash flow indicated a return on investment of about 9% on a discounted cash flow basis for the total project. Essex's investment of $10.2 million plus an additional $1.2 million as our share (20%) of the working capital, indicated a return of only about 5% on a discounted cash flow basis.

Neither return on investment is too attractive and present offerings by Ranchers should be rejected.

GJackson

G.E. Jackson
attachment

cc: H. Lanier

# ESSEX/BLUEBIRD MINE

## RANCHERS PROPOSAL

## AGITATION LEACH/LIX-EW

Basic Assumptions:

| | |
|---|---|
| Tons | 97,680,000 S.T. Ore |
| Grade | .472% Cu @ .20% Cu cutoff |
| % Recovery | Assume 80% |
| Lbs. Cu recovered per ton ore | 7.5 lbs. |
| Tons ore treated per day | 25,000 S.T. |
| Lbs. Cy recovered per day | 187,500 lbs/day |
| Lbs. Cu recovered per year | 65,625,000 lbs |

Capitalization - Total @ $35,800,000
Essex put up $10,000,000 for 20% share ($6.5 million actual)
Help raise additional $29,300,000
Option period - 6 mo. (spend additional $200,000 then).

Costs
Mining - S/R @ 2:1
Assume cost @ .25/ton material
Mining costs @ .75/ton ore or $.10/lb. Cu

| | |
|---|---|
| Milling - Assume | .20/lb. Cu |
| Admin. - Assume | .025 |
| Total | $.325/lb. Cu |

Cost per year - $21,300,000

Income - EW Cu @ 51.5¢ lb.
Minus 1.5¢ discount for net price - .50/lb.
Income per year - $32,800,000

Depreciation - $35,800,000
10 yr. - straight line - $3,580,000/yr.

Taxes @ 53%

Depletion - 50% of net up to $4,920,000/yr.

Form No. X-114 F.W.P.

avoid verbal orders

avo

C O P Y T O

TO P. Eimon LOCATION Tucson, Arizona

FROM G. Jackson LOCATION Tucson, Arizona

SUBJ. Essex/Bluebird Proposal DATE February 16, 1972

A pro-forma cash flow model was developed for a proposed Essex-Ranchers joint venture on the Bluebird Mine, Miami, Arizona. The basic assumptions are attached but show an investment proposal by Ranchers for an initial capital investment by Essex of $10 million for 20% interest. They would also require Essex to spend up to $200,000 additional for test work during an initial six months option period.

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Gjackson

G.E. Jackson
attachment

cc: H. Lanier

## ESSEX/BLUEBIRD MINE

## RANCHERS PROPOSAL

## AGITATION LEACH/LIX-EW

**Basic Assumptions:**

| | |
|---|---|
| Tons | 97,500,000 S.T. Ore |
| Grade | .47% Cu @ .20% Cu cutoff |
| % Recovery | Assume 80% |
| Lbs. Cu recovered per ton ore | 7.5 lbs. |
| Tons ore treated per day | 25,000 S.T. |
| Lbs. Cu recovered per day | 187,500 lbs/day |
| Lbs. Cu recovered per year | 65,625,000 lbs |

**Capitalization** - Total @ $35,800,000
Essex put up $10,000,000 for 20% share ($8.5 million actual)
Help raise additional $29,300,000
Option period - 6 mo. (spend additional $200,000 then).

**Costs**
Mining - S/R @ 2:1
Assume cost @ .25/ton material
Mining costs @ .75/ton ore or $.10/lb. Cu

| | |
|---|---|
| Milling - Assume | .20/lb. Cu |
| Admin. - Assume | .025 |
| Total | $.325/lb. Cu |

Cost per year - $21,300,000

**Income** - EW Cu @ 51.5¢ lb.
Minus 1.5¢ discount for net price - .50/lb.
Income per year - $32,800,000

**Depreciation** - $35,800,000
10 yr. - straight line - $3,580,000/yr.

**Taxes** @ 58%

**Depletion** - 50% of net up to $4,920,000/yr.

Geologic Ore Reserves

ALL BLOCK

** OCTOBER 20, 1971 ** BLUEBIRD MINE MODEL.
DISTRIBUTION TYPE = 1 NORM

→ Ignore

| ASSAY INTERVAL | | FREQ. (1) | Above (2) TOTAL | PCT. | GRADE (4) | Standard DEV. | GRADE-CI | GRADE+CI | INT | |
|---|---|---|---|---|---|---|---|---|---|---|
| .050-- | .100 | 1584. | 13703. | 100.00 | .370 | .264 | .365 | .374 | TOTL | 1 |
| .100-- | .150 | 1293. | 12119. | 88.44 | .409 | .256 | .404 | .413 | TOTL | 2 |
| .150-- | .200 | 1058. | 10826. | 79.00 | .443 | .250 | .438 | .448 | TOTL | 3 |
| .200-- | .250 | 1044. | 9768,000 | 71.28 (3) tons at .2 cutoff & 12.5 t.f. | .472 | .246 | .467 | .477 | TOTL | 4 |
| .250-- | .300 | 1002. | 8724. | 63.66 | .502 | .244 | .497 | .507 | TOTL | 5 |
| .300-- | .350 | 1485. | 7722. | 56.35 | .531 | .245 | .525 | .536 | TOTL | 6 |
| .350-- | .400 | 1328. | 6237. | 45.52 | .580 | .248 | .574 | .586 | TOTL | 7 |
| .400-- | .450 | 936. | 4909. | 35.82 | .636 | .252 | .629 | .643 | TOTL | 8 |
| .450-- | .500 | 798. | 3973. | 28.99 | .686 | .255 | .678 | .694 | TOTL | 9 |
| .500-- | .550 | 602. | 3175. | 23.17 | .740 | .260 | .731 | .749 | TOTL | 10 |
| .550-- | .600 | 666. | 2573. | 18.78 | .790 | .264 | .780 | .800 | TOTL | 11 |
| .600-- | .650 | 286. | 1907. | 13.92 | .865 | .269 | .853 | .877 | TOTL | 12 |
| .650-- | .700 | 258. | 1621. | 11.83 | .908 | .270 | .895 | .921 | TOTL | 13 |
| .700-- | .750 | 192. | 1363. | 9.95 | .952 | .272 | .938 | .967 | TOTL | 14 |
| .750-- | .800 | 204. | 1171. | 8.55 | .990 | .276 | .974 | 1.005 | TOTL | 15 |
| .800-- | .850 | 170. | 967. | 7.06 | 1.035 | .284 | 1.017 | 1.053 | TOTL | 16 |
| .850-- | .900 | 219. | 797. | 5.82 | 1.079 | .294 | 1.059 | 1.100 | TOTL | 17 |
| .900-- | .950 | 105. | 578. | 4.22 | 1.157 | .312 | 1.132 | 1.183 | TOTL | 18 |
| .950-- | 1.000 | 473. | 473. | 3.45 | 1.209 | .322 | 1.180 | 1.238 | TOTL | 19 |

(1) No. o[f] points inter[val]

(2) Above end g[rade] memb[er] of (blks to g[rade] at

(3) 71.28 blocks run run

(4) Avera[ge] of ... above end memb[er]

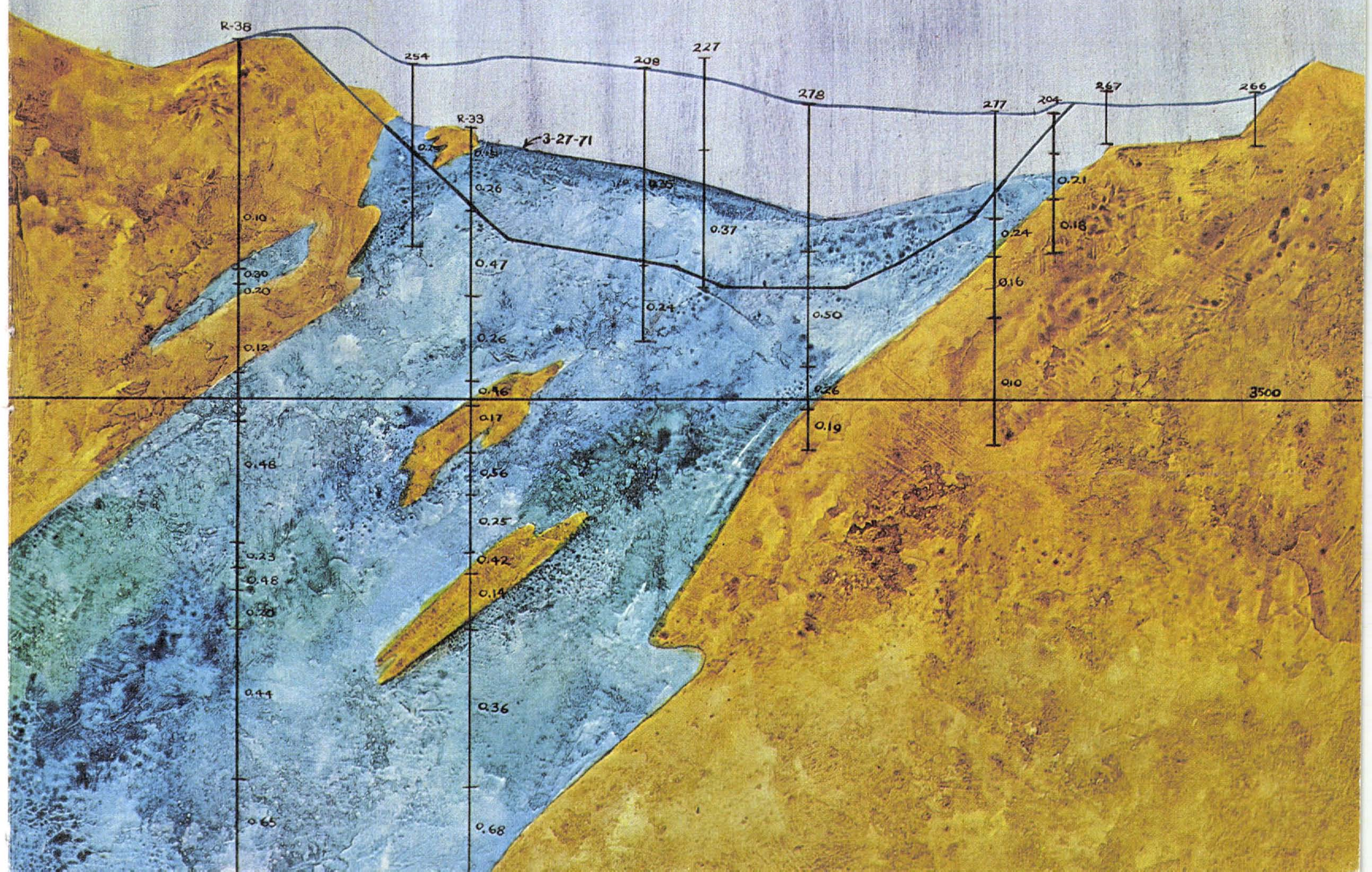
## FROM ORE TO CATHODES WITHOUT POLLUTION

In 1968, the Company's Bluebird Mine became the first commercial producer of cathode copper by solvent extraction – a process which eliminates smelting and the air pollution frequently associated with it. At the Mine, oxide ore (sample in photo contains about seven percent copper, compared to an average of one-half percent for the entire deposit) is placed in large heaps and leached with acid to produce a copper-acid solution which is pumped into the solvent extraction circuit. The solvent separates the copper from the acid and is in turn stripped from the copper by a high acid solution, leaving a concentrated copper-acid solution. This liquid (center photo) is then sent to a unit where current is passed through the solution, attracting the copper ions to thin copper starting sheets. These sheets gradually thicken to form cathodes (last photo) which are more than 99.9 percent pure copper.

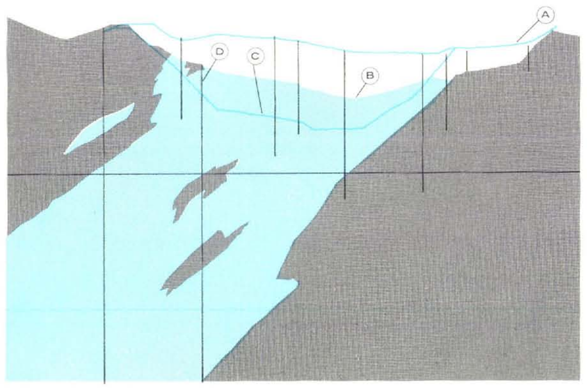
1971 ANNUAL REPORT

# RANCHERS

EXPLORATION AND DEVELOPMENT CORPORATION



The cover of the 1971 Annual Report illustrates rather graphically why the search for minerals is an interesting, exciting, and sometimes a surprisingly rewarding business. The cover drawing – an acrylic by Artist Gene Garriott – shows a cross section (end view) of the main ore body at the Company's Bluebird Mine at Miami, Arizona. Ore is indicated by the dark blue-green color, overburden and ground rock by yellow. Ore already mined originally filled the area between the blue line (A, above) and present surface of the pit (B).




When the Company acquired the Bluebird in 1964, the ore body was thought to consist of approximately 5-million tons of ore, with an additional 5-million tons of inferred ore in other deposits on the property. This information, plus some further drilling, led to a pit design indicated by line "C". This was presumed to be the bottom of the deposit.

What was not apparent from the surface – and what the earlier, shallower drilling did not reveal – was that the deposit is not a flat bed as it appears from the surface, but is tilted, slicing through the earth at about a 45° angle. Many of the earlier drill holes had either gone through the narrow shoulder on the east side of the deposit (right side of drawing) and into the barren ground rock, or had failed to penetrate the thick overburden covering the west side of the deposit. These holes gave the impression that the ore body is thinner than it actually is.

Recent deep drilling (D) has shown that the ore extends to a maximum depth of approximately 1,200 feet. This new ore has increased reserves nearly six-fold, from 13-million tons to about 75-million tons, with potential for additional ore. Ore on the property occurs in two separate deposits – the main ore body at the south end of the property where present mining operations are located, and the north ore body which has not yet been mined. The new reserves will greatly extend the life of the property – now being mined at about 2.9-million tons of ore annually – while eventually permitting a significant increase in production.

Since the Company began production at the Bluebird in October 1964, the Mine has produced 13-million tons of ore and 55,875,581 pounds of copper, which have been sold for $27,865,045. Cost of acquiring the property and bringing it into production was less than $1-million. The cathode production plant installed in 1968 cost approximately $2.7-million.

THE 1971 ANNUAL REPORT / Design and Layout – Mary Garriott / Cover – Gene Garriott / Photography – Dick Kent / Typography – Reay's Typographic Service Company, Inc. / Printing – The McLeod Printing Company

market value on the date of the grant and become exercisable principally in five equal annual installments following dates of grant, and expire five years from date of grant.

Options exercised, exercisable, and outstanding are summarized as follows:

| | Stock Option Plan | | Other | | Total |
|---|---|---|---|---|---|
| | Shares | Price | Shares | Price | Shares |
| Outstanding June 30, 1969 | 22,536 | $2.50-23.50 | 10,000 | $17.00 | 32,536 |
| Year ended June 30, 1970: | | | | | |
| Granted | 10,600 | $10.25-20.00 | 43,500 | $11.50-19.00 | 54,100 |
| Exercised | (800) | $9.50 | -0- | | (800) |
| Cancelled | (3,000) | $20.00 | (7,000) | $12.00 | (10,000) |
| Outstanding June 30, 1970 | 29,336 | $2.50-23.50 | 46,500 | $11.50-19.00 | 75,836 |
| Exercisable June 30, 1970 | 8,536 | $2.50-23.50 | 3,334 | $17.50 | 11,870 |
| Year ended June 30, 1971: | | | | | |
| Granted | 2,750 | $12.94 | -0- | -0- | 2,750 |
| Exercised | (4,336) | $2.50-3.25 | (1,000) | $17.50 | (5,336) |
| Cancelled | (4,000) | $10.25-23.50 | (7,000) | $19.00 | (11,000) |
| Outstanding June 30, 1971 | 23,750 | $9.50-23.50 | 38,500 | $11.50-19.00 | 62,250 |
| Exercisable June 30, 1971 | 7,820 | $9.50-23.50 | 11,768 | $11.50-19.00 | 19,588 |

## Note H – Income Per Share

Net income per share of Common Stock was computed on the basis of the weighted average number of shares outstanding during each year. Fully diluted income per share assumes the conversion of all outstanding convertible debentures (issued in January, 1969) at the beginning of the year.

## Note I – Litigation

A contractor has filed a claim for approximately $1,060,000 in the United States District Court in Nevada as a result of alleged extra work done for the Company in connection with construction work at the Big Mike Mine in Nevada. The Company has filed a counterclaim for approximately $1,695,000 for claimed delays and poor performance by the contractor. In the opinion of Company's legal counsel the Company's recovery will exceed any amounts due the contractor for extra work.

The Company is engaged in other litigation, but in the opinion of Company's legal counsel, final settlement of any of the matters involved should have no material effect on the Company's financial position.

## Note J – Subsequent Events

The Company has been advised that on August 5, 1971 a judgment was entered in its favor in connection with the law suit explained in Note A. The judgment is in the amount of $226,905 with interest at 6% (approximately $44,800 to August 9, 1971) from April 24, 1968, until paid. The judgment is subject to appeal.

On August 9, 1971, the Company announced it was suspending operations at its Tungsten Queen Mine, and placing the facility on standby until an increase in the selling price of tungsten would permit reactivation. Sales from the Mine amounted to $754,325 in 1971 and $58,987 in 1970. Operations, before income tax effects, resulted in an operating loss of $873,525 in 1971 and an operating gain of $36,256 in 1970.

Stockholders and Board of Directors
Ranchers Exploration and Development Corporation
Albuquerque, New Mexico

We have examined the financial statements of Ranchers Exploration and Development Corporation for the years ended June 30, 1971 and 1970. Our examinations were made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying balance sheet and statements of income, stockholders' equity, and changes in financial position present fairly the financial position of Ranchers Exploration and Development Corporation at June 30, 1971 and 1970 and the results of its operations, changes in stockholders' equity, and changes in financial position for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

Ernst & Ernst

Albuquerque, New Mexico
July 28, 1971, except as to Note J, as to which the date is August 9, 1971

**Ranchers Exploration and Development Corporation**

**General Offices**

1776 Montano Road, NW
Albuquerque, New Mexico 87107

**Transfer Agent & Registrar**

Republic National Bank of Dallas
Corporate Trust Department
Dallas, Texas 75221

Manufacturers Hanover Trust Company
Corporate Trust Department
40 Wall Street
New York, New York 10015

**Note D – Investment in Joint Venture**

The amount shown represents the costs of mining leases ($61,699) and cash contributed, less the Company's share of expenditures to date, by the Company to a joint venture organized for the purpose of engaging in the exploration for uranium on mining leases and claims in New Mexico. The joint venture agreement provides that the Company will share in 50% of the profits and 25% of the exploration expenditures of the venture. The Company's share of exploration expenditures amounted to $107,099 for the year ended June 30, 1971 and $166,444 for the year ended June 30, 1970.

**Note E – Long-Term Debt**

The debentures, which bear interest at the rate of 5¾%, are convertible into one share of Common Stock for each $24.71 of principal amount, and are subordinated to all outstanding or subsequently incurred senior indebtedness. The debentures are redeemable, at the option of the Company, in whole or in part at redemption prices ranging downward from 105.074% beginning January 15, 1971 to 100% beginning January 15, 1988. The indenture provides for an annual sinking fund payment in the amount of $118,500 beginning January 15, 1970, which can be reduced by the principal amount of debentures purchased by the Company. The indenture, among other things, provides limitations upon payment of cash dividends and the amount of Common Stock the Company can purchase for treasury. Retained earnings available for payment of cash dividends amounted to $3,462,396 at June 30, 1971 and $2,360,285 at June 30, 1970.

Debt discount and expense incurred in connection with registration and sale of the debentures is being amortized over the life of the outstanding debentures.

Also included in the long-term debt is a bank loan in the original amount of $5,000,000, with a balance of $1,500,000 at June 30, 1971. The amount borrowed is represented by two notes under one loan agreement. Assigned and mortgaged as collateral on the notes are all mining leases from which the Company derives its uranium royalties and all properties and proceeds of production at the Bluebird Copper Mine, the Big Mike Copper Mine, and the Tungsten Queen Mine. In addition, the loan agreement provides that the Company shall maintain current assets at 125% of current liabilities and requires that net income plus depreciation and depletion in any fiscal year be adequate to provide 120% of amounts required to service all secured indebtedness of the Company for that fiscal year. The loan agreement also includes restrictions regarding additional indebtedness and other matters.

One note with an unpaid balance of $900,000 bears interest at 7½% and is repayable in installments of $60,000 plus interest on July 1, 1971, and $30,000 plus interest monthly thereafter. The other note with an unpaid balance of $600,000 bears interest at 7½% but requires an adjustment of interest to prime rate plus 1½% if the prime rate increases or decreases. This note requires repayment of $140,000 plus interest on July 1, 1971, and $70,000 plus interest monthly thereafter.

The contract payable for purchase of mineral interest requires minimum annual payments of $40,000 beginning January 1, 1971 and bears no interest. Annual payments may be increased depending upon production from the property.

**Note F – Federal and State Income Taxes**

The Company elects to deduct certain mining and development costs for income tax purposes while such costs have been deferred for financial reporting purposes and are being amortized over the production units (metal) benefited by such expenditures or, for leach heap preparation over an estimated three-year life. Income taxes deferred, as a result of currently deducting such mining and development costs, have been charged or credited to income.

Investment tax credits of $72,592 for 1971 and $54,600 for 1970 have been used to reduce the income tax provision.

**Note G – Stock Options**

At June 30, 1971, 63,368 shares of Common Stock were reserved for issuance to certain officers and employees under the Company's stock option plan. The amount reserved at June 30, 1971 includes 36,000 shares which were reserved during the year ended June 30, 1971. Of the 63,368 shares reserved for options, 23,750 were covered by options outstanding and 39,618 were available for future grant. Options may be granted at prices not less than market value at date of grant, become exercisable principally in five equal annual installments following dates of grant, and expire five years from date of grant.

In addition, the Company has granted other options, principally to directors, not under the stock option plan, which are priced at fair

# 1971 ANNUAL REPORT

# RANCHERS

## EXPLORATION AND DEVELOPMENT CORPORATION

*Directors*

**Maxie L. Anderson**, Albuquerque, President, Ranchers Exploration and Development Corporation / **Frank Coolbaugh**, Denver, Mining Consultant / **Edward E. Monteith, Jr.**, Dallas, Executive Vice President, Republic National Bank of Dallas / **Roy Richards**, Carrollton, Georgia, President, Southwire Company / **Robert V. Sibert**, Beverly Hills, California, President, Pearson-Sibert Oil Company of Texas

*Officers*

**Maxie L. Anderson**, President / **Leland O. Erdahl**, Vice President, Finance, and Treasurer / **Arthur Miller**, Vice President, Construction / **John E. Motica**, Vice President, Geology / **Milton H. Ward**, Vice President, Operations / **Herbert M. Campbell II**, Secretary

# LETTER TO STOCKHOLDERS

## Earnings Decline, Tungsten on Standby, Copper Production and Reserves Increase

The Company experienced a decline in earnings in 1971, and the Tungsten Queen Mine was placed on standby after being in production less than a year. However, record copper production and a major increase in reserves at the Bluebird Mine helped to balance out the year and to improve prospects for the future.

The most significant developments of 1971:

1. Net earnings were $.70 per share, including $.09 extraordinary income, a decline of 38 percent from the $1.12 per share earned in 1970.

2. The Tungsten Queen Mine, hampered by operating problems throughout the year, was placed on standby in August 1971 after a serious decline in tungsten prices.

3. Production at the Bluebird Copper Mine totaled a record 11.8-million pounds, an increase of 12 percent over 1970.

4. Drilling at the Bluebird increased reserves nearly six-fold to about 75-million tons, with good potential for additional ore reserves.

5. Uranium royalties increased, and the market outlook for the metal improved as orders rose for new nuclear power plants.

6. The Old Reliable copper property near San Manuel, Arizona, was acquired in June, after extended engineering and geologic investigations.

The Company had expected an increase in earnings for the year, primarily as the result of greater copper production and some contribution in the second half from the Tungsten Queen. Copper production did increase significantly, totaling more than 23-million pounds, an increase of 34 percent over 1970, but losses at the Tungsten Queen more than offset this gain. The net loss for the year at the Tungsten Queen, before considering the effect of income taxes, was $873,525.

Despite this loss, the decision to suspend operations at the Mine was a very difficult one to make. The mining and milling problems which had hampered operations since startup in August 1970 seemed at last to be coming under control. Recovery of metal values from the ore, the most trying problem encountered during the year, had risen to a very respectable 83 percent at year-end, and mining costs per ton had fallen sharply as more experienced miners were brought in.

Unfortunately, as these improvements were being made, the price of tungsten was declining precipitously, falling from $68.50 per short ton unit in late 1970 to $36-$41 per STU in August 1971. It was apparent that at this price level, which may last for some time, principally because of the world-wide slump in industrial production, that the Mine would continue to

| | 1971 | 1970 |
|---|---|---|
| INCREASE (DECREASE) IN WORKING CAPITAL | | |
| Increase (decrease) in current assets: | | |
| Cash | $ (25,077) | $ 1,194,939 |
| Marketable securities | (1,254,153) | 1,114,484 |
| Trade accounts receivable | (3,363,164) | 3,289,230 |
| Recoverable federal income taxes | (93,400) | 118,400 |
| Inventories | 843,928 | 714,149 |
| Prepaid expenses and other current assets | (13,149) | (88,825) |
| Deferred income tax charge | (65,000) | 65,000 |
| Deposits with brokers for copper futures contracts | -0- | (158,645) |
| | (3,970,015) | 6,248,732 |
| Increase (decrease) in current liabilities: | | |
| Notes payable to bank | (720,000) | 523,759 |
| Trade accounts payable | (386,917) | 826,725 |
| Accrued interest payable | (32,413) | 28,148 |
| Federal and state income taxes | 4,000 | 51,000 |
| Other liabilities | 69,348 | 54,728 |
| Current portion of long-term debt | (644,290) | 1,901,221 |
| | (1,710,272) | 3,385,581 |
| INCREASE (DECREASE) IN WORKING CAPITAL | $ (2,259,743) | $ 2,863,151 |



# Notes to Financial Statements/*June 30, 1971*

### Note A – Trade Accounts Receivable

The Company has filed suit in federal court in Arizona against a customer for collection of a receivable ($218,039) for copper sold in February and March, 1968. The customer has refused to pay, claiming delivery was not made in accordance with dates specified in the contract. In the opinion of Company's counsel, the amount will be collected, but because of the uncertainty of the collection date the amount is classified as a non-current asset.

### Note B – Inventories

Inventories are stated at the lower of cost (principally average cost) or market and consist of the following:

| | June 30 1971 | June 30 1970 |
|---|---|---|
| Finished metals and metal products | $ 922,751 | $ 26,068 |
| Ore in leaching heaps and stockpiles | 1,042,722 | 1,268,490 |
| Supplies | 621,198 | 420,753 |
| Costs incurred in cancellation of futures contracts replaced with more favorable sales contracts | 20,451 | 47,883 |
| | $2,607,122 | $1,763,194 |

The Company hedges sales of part of its production of cathode copper through the sale of futures contracts. As these contracts are re-purchased and replaced with more favorable sales contracts, the resulting costs are added to inventory. These amounts are charged to income when delivery is made under the sales contracts.

### Note C – Depreciation, Depletion and Amortization

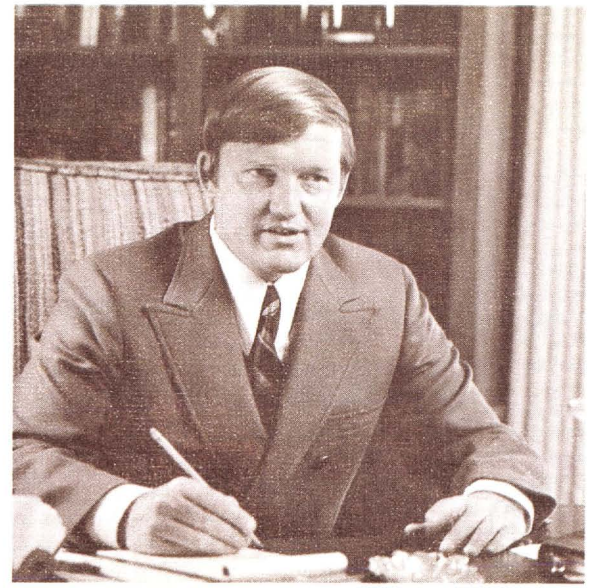
It is the policy of the Company to provide for depreciation, depletion and amortization by using annual rates which are sufficient to amortize the cost of equipment over its estimated useful life and to amortize the costs of leases and mine development over the productive lives of the mines, based on estimated reserves. Declining-balance and straight-line methods are used for computing depreciation, both for federal income-tax purposes and financial reporting. Costs of producing leases and related mine development costs are being amortized by using the unit-of-production method. Depreciation, depletion and amortization of property, plant and equipment charged to income amounted to $4,860,877 in 1971 and $3,640,743 in 1970.

# Statement of Changes in Financial Position

## *Year Ended June 30, 1971 and June 30, 1970*

| | 1971 | 1970 |
|---|---|---|
| ADDITIONS | | |
| Income before extraordinary items | $ 931,038 | $ 1,871,028 |
| Provisions for depreciation, depletion and amortization | 4,860,877 | 3,640,743 |
| Amortization of debt discount and expense | 50,945 | 35,940 |
| Increase in deferred income taxes | 75,000 | 860,000 |
| WORKING CAPITAL PROVIDED FROM OPERATIONS EXCLUSIVE OF EXTRAORDINARY ITEMS | 5,917,860 | 6,407,711 |
| Extraordinary items: | | |
| Proceeds from sale of marketable securities in excess of carrying amount, less applicable income taxes of $40,599 | 121,679 | -0- |
| Provision for decline in market value of marketable securities, less applicable recoverable income taxes of $65,000 | -0- | (195,000) |
| Gain on repurchase of Company debentures less applicable income taxes of $23,247 | 19,803 | -0- |
| TOTAL FROM OPERATIONS | 6,059,342 | 6,212,711 |
| Increase in long-term debt | -0- | 3,291,747 |
| Issue of Common Stock for purchase of mineral interest | -0- | 1,072,500 |
| Proceeds from sale of previously unissued stock | 29,592 | 7,600 |
| Issue of Common Stock held in treasury for purchase of mineral interests | -0- | 260,435 |
| Decrease in certificates of deposit and other marketable securities earmarked for construction and acquisition of mining properties | -0- | 3,296,257 |
| Decrease in other assets | 165 | -0- |
| TOTAL | $ 6,089,099 | $14,141,250 |
| DEDUCTIONS | | |
| Decrease in long-term debt | $ 2,943,738 | $ -0- |
| Additions to depreciable property, plant, and equipment (1971 – $1,888,787; 1970 – $4,223,478) less carrying amounts of disposals and abandonments | 1,846,076 | 4,193,999 |
| Additions to mineral interests, mining claims, leases and permits less abandonments of $57,020 in 1970 | 63,536 | 1,603,099 |
| Additions to deferred mining and development costs | 3,164,258 | 4,895,333 |
| Increase in other assets | -0- | 87,239 |
| Purchase of debentures for treasury | 205,000 | 290,000 |
| Cost of Common Stock purchased for treasury | 126,234 | 208,429 |
| TOTAL | $ 8,348,842 | $11,278,099 |
| INCREASE (DECREASE) IN WORKING CAPITAL | $ (2,259,743) | $ 2,863,151 |





operate at a substantial loss. Under these circumstances, it appeared best to halt operations, and to direct the Company's efforts to projects which offer a higher, more immediate return on investment.

Foremost among these projects is development of a mining and refining operation which will permit the Company to derive maximum benefit from the greatly expanded reserves at the Bluebird Mine. These reserves – whose discovery is perhaps the most significant event to date in the Company's history – are of unusual importance to the Company for several reasons. They are situated where the Company already has a proven and profitable mining operation; they will permit a sizable expansion of this operation; and they make it possible to consider a change in the leaching portion of this operation so that recovery of copper from the ore would be greatly enhanced, thus, in effect, further extending the productive life of the property.

Installation of a vat or agitation leaching system, two of the leaching methods which the Company is investigating, would approximately double recovery of copper from each ton of Bluebird ore, and similarly affect cathode production without any substantial increase in the mining rate. It is clear, however, that the increased reserves also make it desirable from an economic standpoint to expand the mining rate significantly.

A change in the leaching system would require a great deal of capital, and because of this the Company will proceed cautiously. It likely would take at least two years to make the change and to begin receiving the initial benefits. In the meantime, the Bluebird should remain a very successful heap leaching operation. Production during the current fiscal year will approximate 13-million pounds, and profits should increase somewhat as the result of a decrease in the price of sulfuric acid used in leaching.

The price of copper will dictate how quickly the Company moves in bringing the Old Reliable property into production. The Company is investigating the possibility of fracturing the ore body with conventional explosives and leaching the ore in place. This approach could make the property a low-cost copper producer. Benefits would be realized over a five-year period beginning in fiscal year 1973, if the project goes forward this fiscal year.

Another project which will receive considerable attention this year is the Section 7 uranium deposit in Ambrosia Lake. The Company is encouraged by the upsurge in orders for new nuclear power plants, and will begin preliminary engineering studies on the section later this year. Exploration will continue with funds remaining in the joint venture, and some consideration will be given to acquiring additional reserves.

In addition to the Section 7, Old Reliable, and Bluebird projects, the Company will probably proceed with production of cement copper from the stockpiled ore at the Big Mike Mine at Winnemucca, Nevada. Work on these projects, along with a continuing exploration effort, will constitute the Company's major activity during the new year.

August 24, 1971

Maxie L. Anderson, President

# Revenues Up, Earnings Down

## Copper Sales Help Establish Record Gross But Tungsten Losses Reduce Net Earnings

Gross revenue reached a record high in 1971, but net earnings fell as the result of operating losses at the Tungsten Queen. Net earnings per share were $.70, compared to $1.12 in 1970. Net losses at the Tungsten Queen were approximately $.57 per share, before taking into consideration the effect of income taxes.

The record gross of $16,075,656 reflected greater production at the Bluebird Mine and shipment to foreign smelters of the remaining high grade ore from the Big Mike Mine. The total represented an increase of about 35 percent over the $11,926,694 grossed last year.

Copper sales totaled $14,439,269 for the year, including $7,654,851 from the Bluebird and $6,784,418 from Big Mike. Uranium royalties were $724,341, up about 19 percent from the $611,118 received in 1970. Tungsten sales, dividends, interest, and miscellaneous items accounted for the remaining revenue of about $912,046.

Net earnings from operations were $931,038, a decrease of 50 percent from the $1,871,028 earned from operations last year. Total net earnings were $1,072,520, compared to $1,676,028 a year ago. This year's total was increased by $141,482 in extraordinary income, principally from sale of stock, while the 1970 total was decreased by $195,000 on a decline in market value of stock held for investment.

The net earnings of $.70 per share included $.61 per share from operations and $.09 per share extraordinary earnings, primarily from sale of stock. Net earnings in 1970 were $1.25 per share from operations and a loss of $.13 per share representing a decline in market value of stock held for investment.

### Financial Highlights

| | 1971 | 1970 |
|---|---|---|
| Gross Income | $16,075,656 | $11,926,694 |
| Net Earnings before Income Taxes | $ 1,102,326 | $ 2,665,645 |
| Income Taxes | $ 171,288 | $ 794,617 |
| Net Earnings before Extraordinary Income | $ 931,038 | $ 1,871,028 |
| Extraordinary Income Net of Income Taxes | $ 141,482 | $ (195,000) |
| Net Earnings | 1,072,520 | $ 1,676,028 |
| Earnings per Share: | | |
| Ordinary | $ .61 | $1.25 |
| Extraordinary | $ .09 | $ (.13) |
| Total | $ .70 | $1.12 |
| Retained Earnings | $ 6,171,790 | $ 5,099,270 |
| Stockholders' Equity | $12,266,790 | $11,290,912 |
| Equity per Share | $8.03 | $7.37 |



# Statement of Stockholders' Equity

## Year Ended June 30, 1971 and June 30, 1970

| | 1971 | 1970 |
|---|---|---|
| COMMON STOCK | | |
| Balance at beginning of year | $ 768,445 | $ 369,022 |
| Par value of shares issued: | | |
| Sold under stock option plan (1971 – 5,336 shares; 1970 – 400 shares) | 2,669 | 200 |
| For purchase of Big Mike Mine – 30,000 shares | -0- | 15,000 |
| Stock split-up (2 for 1) effected in the form of a dividend – 768,446 shares | -0- | 384,223 |
| BALANCE AT END OF YEAR | $ 771,114 | $ 768,445 |
| CAPITAL IN EXCESS OF PAR VALUE | | |
| Balance at beginning of year | $ 5,482,658 | $ 4,728,876 |
| Proceeds or market value in excess of par value of shares of Common Stock issued: | | |
| Sold under stock option plan | 26,923 | 7,400 |
| For purchase of Big Mike Mine | -0- | 1,057,500 |
| Excess of market value over cost of treasury stock (7,470 shares) issued for purchase of Big Mike Mine | -0- | 73,105 |
| Transferred to capital stock for par value of 768,446 shares issued in 2 for 1 stock split-up | -0- | (384,223) |
| BALANCE AT END OF YEAR | $ 5,509,581 | $ 5,482,658 |
| RETAINED EARNINGS | | |
| Balance at beginning of year | $ 5,099,270 | $ 3,423,242 |
| Net income for the year | 1,072,520 | 1,676,028 |
| BALANCE AT END OF YEAR | $ 6,171,790 | $ 5,099,270 |
| TREASURY STOCK | | |
| Balance at beginning of year | $ 59,461 | $ 38,362 |
| Purchase of shares for treasury (1971 – 8,768 shares; 1970 – 9,800 shares) | 126,234 | 208,429 |
| | 185,695 | 246,791 |
| Cost of treasury shares issued for mines and mineral leases | -0- | (187,330) |
| BALANCE AT END OF YEAR | $ 185,695 | $ 59,461 |

See notes to financial statements

# Statement of Income

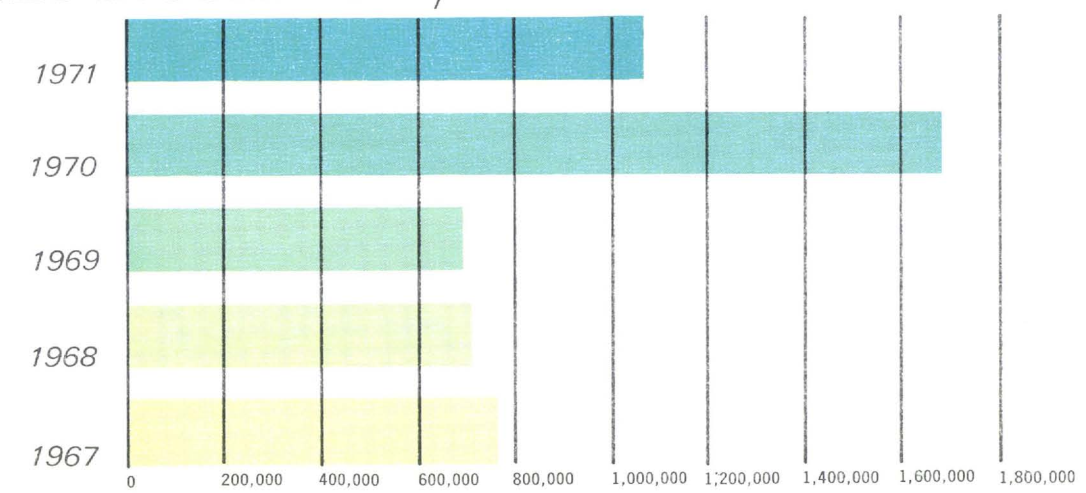
## Year Ended June 30, 1971 and June 30, 1970

| | 1971 | 1970 |
|---|---|---|
| Income | | |
| Net sales | $15,193,594 | $11,039,462 |
| Uranium royalties | 724,341 | 611,118 |
| Interest, dividends, and other | 157,721 | 276,114 |
| | 16,075,656 | 11,926,694 |
| Deductions from income – Notes B, C and D | | |
| Cost of products sold | 13,388,228 | 8,176,439 |
| Exploration, conservation, and maintenance of mining properties | 447,550 | 306,893 |
| Administrative and general expense | 575,489 | 417,059 |
| Interest, principally on long-term debt | 562,063 | 303,658 |
| Lease abandonments | -0- | 57,000 |
| | 14,973,330 | 9,261,049 |
| INCOME FROM OPERATIONS BEFORE APPLICABLE INCOME TAXES | 1,102,326 | 2,665,645 |
| Federal and state income taxes – Note F | | |
| Currently payable (recoverable) | 96,288 | (65,383) |
| Deferred | 75,000 | 860,000 |
| | 171,288 | 794,617 |
| INCOME BEFORE EXTRAORDINARY ITEMS | 931,038 | 1,871,028 |
| Extraordinary items: | | |
| Proceeds from sale of marketable securities in excess of carrying amount, less applicable income taxes of $40,599 | 121,679 | -0- |
| Provision for decline in market value of marketable securities, less applicable recoverable income taxes of $65,000 | -0- | (195,000) |
| Gain on repurchase of Company debentures less applicable income taxes of $23,247 | 19,803 | -0- |
| | 141,482 | (195,000) |
| NET INCOME | $ 1,072,520 | $ 1,676,028 |
| Earnings per common share – Note H | | |
| Income before extraordinary items | $.61 | $1.25 |
| Extraordinary items | .09 | (.13) |
| NET INCOME | $.70 | $1.12 |
| Earnings per common share – assuming full dilution – Note H | | |
| Income before extraordinary items | $.61 | $1.21 |
| Extraordinary items | .09 | (.13) |
| NET INCOME | $.70 | $1.08 |

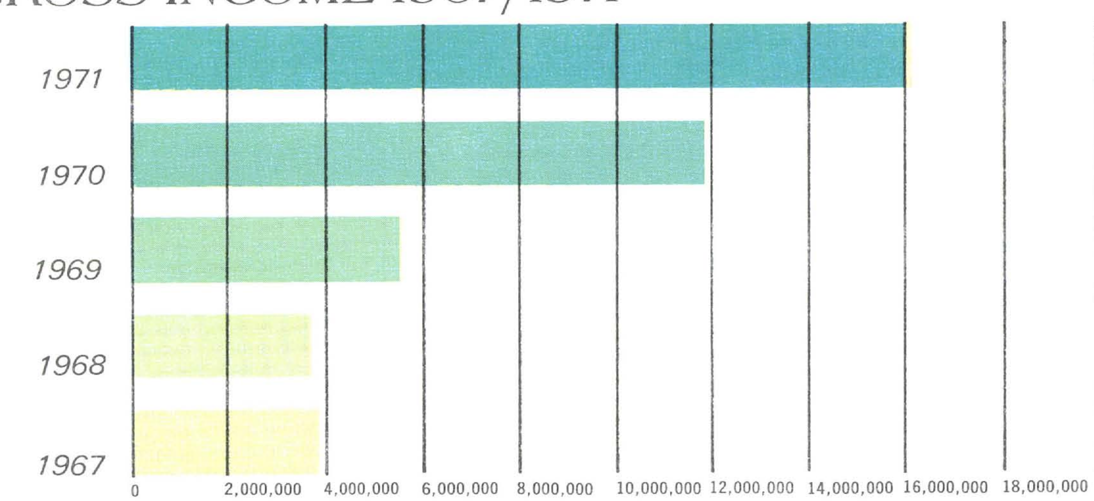
See notes to financial statements



## NET INCOME 1967/1971




## GROSS INCOME 1967/1971



# A Good Year for Copper

## Record Production, New Reserves Highlight 1971; Company Exercises Option on Old Reliable Property

Record production and a major increase in reserves at the Bluebird Mine highlighted the Company's copper operations in 1971. The Company also elected to exercise its option on the Old Reliable copper property near San Manuel, Arizona, following extensive geologic and engineering evaluations.

Operations were quite successful at the Bluebird. Production reached a record 11,859,533 pounds of cathodes, an increase of 12 percent over the 10,556,855 pounds produced last year and well in excess of the production goal for the year of 11.5-million pounds. Sales, which included $983,704 in revenue from sale of copper purchased for starter sheets, totaled $7,654,851, compared to $6,846,243 a year ago.

Profits from the operation were slightly lower than in 1970, despite satisfactory copper prices averaging about $.57 per pound. Chief reasons for the decline in profitability were a significantly higher stripping rate (removal of overburden), greater acid consumption in the leaching heaps, and lower grade ore. About 2,871,000 tons of ore and 2,955,000 tons of overburden were moved during the year, compared to 2,340,000 tons of ore and 1,609,000 tons of overburden moved in 1970.

The stripping ratio is expected to remain about the same in the present year, but profits should improve somewhat because of higher production and a substantial decrease in the cost of acid. Acid prices are expected to decline to about $18 per ton, compared to the $31 per ton paid last year. The Company has sold about 55 percent of the Mine's projected output of 13-million pounds at prices averaging approximately $.55 per pound.

The most significant development at the Bluebird during the year was the addition of substantial new ore reserves. Reserves on the property at the beginning of the year had been estimated at about 13-million tons of ore with an average grade of .50 percent copper. Drilling during the year increased indicated reserves to about 75-million tons of ore, with an average grade of .52 percent copper, and the property has good potential for additional ore reserves. While engineering studies have not been completed, it appears that the reserves can be mined with a stripping ratio of approximately 1½ tons of overburden to one ton of ore.

Further drilling must be conducted on the property to fully delineate the reserves. However, the Company has already begun preliminary planning to determine the optimum manner of expanding operations at the Mine. It now appears that it may be desirable to change the method of extracting the copper from the ore. The ore is currently placed in heaps, which are leached with acid and water to produce a copper-bearing solution which is converted into cathodes.

Heap leaching is a relatively inexpensive method of removing copper from the ore, but it results in recovery of less than half the copper. Vat leaching, agitation leaching, and other methods of ore treatment which could approximately double recovery of copper values are being investigated by the Company now that the Mine's reserves appear great enough to support the sizable capital costs of these leaching systems. Selection and installation of one of these systems would ultimately mean a major increase in copper production at the Mine.

(Continued)

Aerial view of Bluebird Mine with solvent extraction plant in foreground

# Liabilities and Stockholders' Equity

## *Balance Sheet/June 30, 1971 and June 30, 1970*

| | 1971 | 1970 |
|---|---|---|
| CURRENT LIABILITIES | | |
| Notes payable to bank | $ -0- | $ 720,000 |
| Trade accounts payable | 889,651 | 1,276,568 |
| Accrued interest payable | 75,277 | 107,690 |
| Federal and state income taxes | 59,000 | 55,000 |
| Other liabilities | 200,452 | 131,104 |
| Current portion of long-term debt | 1,446,577 | 2,090,867 |
| TOTAL CURRENT LIABILITIES | 2,670,957 | 4,381,229 |
| LONG-TERM DEBT – Note E | | |
| 5¾% convertible subordinated debentures due January 15, 1989 | 2,495,000 | 2,700,000 |
| Notes payable to banks | 1,500,000 | 5,000,000 |
| Contract payable for purchase of mineral interest | 162,405 | 200,000 |
| Lease-purchase contracts – equipment pledged as collateral (Cost: 1971 – $113,808; 1970 – $345,068) | 52,901 | 103,334 |
| | 4,210,306 | 8,003,334 |
| Less portion classified as current liability | 1,446,577 | 2,090,867 |
| | 2,763,729 | 5,912,467 |
| DEFERRED FEDERAL AND STATE INCOME TAXES – Note F | 1,375,000 | 1,300,000 |
| STOCKHOLDERS' EQUITY – Notes G and H | | |
| Common Stock – par value $.50 a share: | | |
| Shares authorized (1971 – 4,000,000; 1970 – 2,000,000) | | |
| Shares issued (1971 – 1,542,228; 1970 – 1,536,892) including shares in treasury | 771,114 | 768,445 |
| Capital in excess of par value | 5,509,581 | 5,482,658 |
| Retained earnings | 6,171,790 | 5,099,270 |
| | 12,452,485 | 11,350,373 |
| Less cost of Common Stock in treasury (1971 – 14,108 shares; 1970 – 5,340 shares) | 185,695 | 59,461 |
| | 12,266,790 | 11,290,912 |
| | $19,076,476 | $22,884,608 |

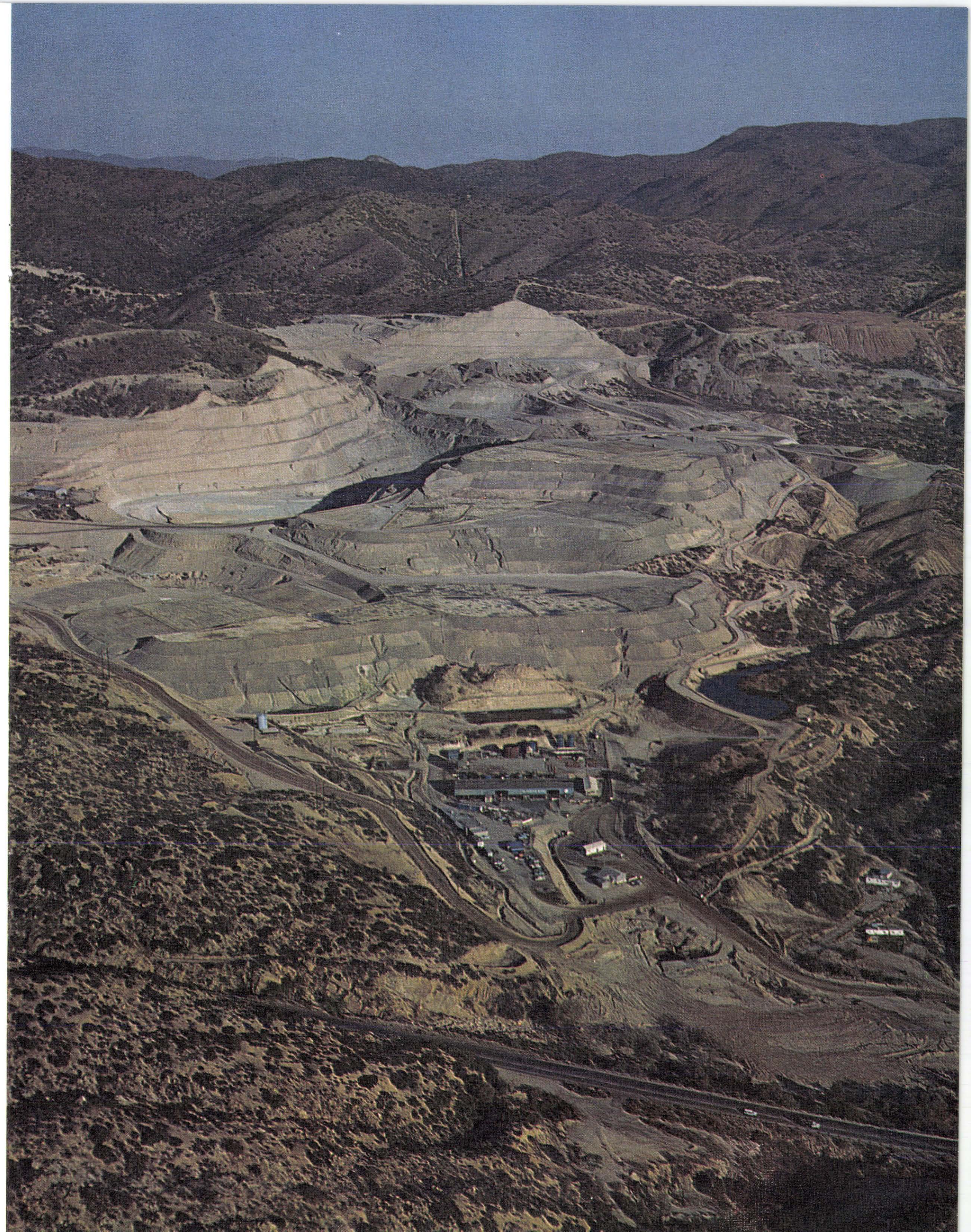
See notes to financial statements

# Assets

## Balance Sheet/June 30, 1971 and June 30, 1970

| | 1971 | 1970 |
|---|---|---|
| CURRENT ASSETS | | |
| Cash and certificates of deposit | $ 1,952,690 | $ 1,977,767 |
| Marketable securities – (1971 at cost – approximately market; 1970 at cost less $260,000 reduction to market value) | 61,611 | 1,315,764 |
| Trade accounts receivable | 341,311 | 3,704,475 |
| Recoverable federal income taxes | 25,000 | 118,400 |
| Inventories – Note B | 2,607,122 | 1,763,194 |
| Prepaid expenses and other current assets | 152,546 | 165,695 |
| Deferred income tax charge | -0- | 65,000 |
| TOTAL CURRENT ASSETS | 5,140,280 | 9,110,295 |
| PROPERTY, PLANT, AND EQUIPMENT – on the basis of cost – Notes C and E | | |
| Land | 66,054 | 66,054 |
| Buildings and equipment | 11,211,416 | 6,960,470 |
| Construction in progress – estimated additional costs to complete (1971 – $335,000; 1970 – $800,000) | 90,441 | 2,534,760 |
| Mineral interests, mining claims, leases and permits | 1,169,929 | 2,547,382 |
| Deferred intangible mining and development costs | 4,532,377 | 6,135,916 |
| | 17,070,217 | 18,244,582 |
| Allowances for depreciation, depletion, and amortization | 3,708,243 | 5,095,601 |
| | 13,361,974 | 13,148,981 |
| OTHER ASSETS AND DEFERRED CHARGES | | |
| Trade accounts receivable – Note A | 218,039 | 218,039 |
| Investment in joint venture – Note D | 219,807 | 219,972 |
| Unamortized debt discount and expense – Note E | 136,376 | 187,321 |
| | 574,222 | 625,332 |
| | $19,076,476 | $22,884,608 |

See notes to financial statements



Shipment of high grade sulphide copper ore from the Big Mike deposit at Winnemucca, Nevada, to foreign smelters was completed during the first quarter of the fiscal year. Another 2,000 tons of ore were shipped to domestic smelters in the second quarter, bringing foreign and domestic shipments from the deposit to a total of 94,000 tons in 1970 and 1971. Shipments during fiscal year 1971 contained 11,403,732 pounds of copper, which were sold for $7,200,739. Cerro Corporation's 20% net profits interest in the project amounted to $416,321, thus reducing net revenue to $6,784,418.

About 300,000 tons of oxide-sulphide ore, containing approximately two percent copper, are still in stockpile at the Mine, and will be leached and treated in a precipitation plant to produce cement copper. Production is tentatively scheduled to begin in November, but may be delayed if the price of copper declines. Full production from November through June would result in output of about 1.6-million pounds of copper. Production would continue during fiscal years 1973 and 1974, and perhaps longer if the price of copper permits treatment of 400,000 tons of ore remaining in place in the Big Mike ore deposit.

The price of copper will also determine when the recently-acquired Old Reliable deposit is brought into production. Drilling on the deposit, acquired from Occidental Minerals Corporation, has confirmed that it contains approximately 4-million tons of ore with a copper content of .74 percent. The deposit occurs in a pipe-like structure which the Company believes could be fractured with explosives and leached by percolating solutions through the shattered ore to remove the copper. It is estimated that about 30-million pounds of copper could be recovered in this manner over a period of five years, making the property a low-cost, short-term producer of cement copper. Production would begin, at the earliest, some time in fiscal year 1973.

Occidental has retained a 20 percent net profits interest in the property, commencing after the Company has recovered its total investment in the property and in production facilities. Occidental will also receive a production payment of not more than $200,000 and $150,000 in cash, $50,000 of which has already been paid.

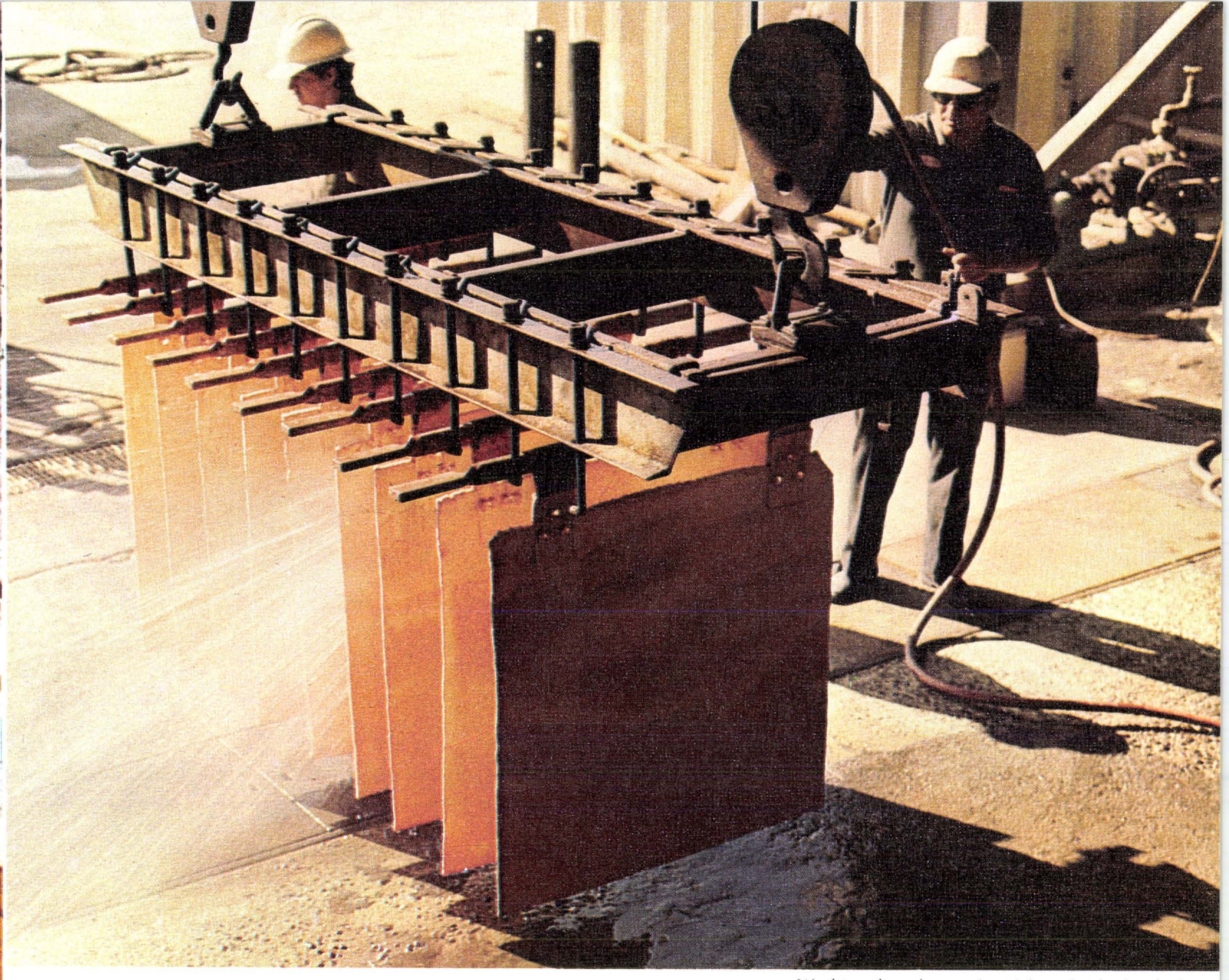
Side View
of Bluebird
Ore Deposits
(Looking East)
Proven Ore (1970)
New Ore (1971)
Barren Rock
----Surface of south ore body before mining commenced in 1964

Drilling blast holes in vein at Tungsten Queen

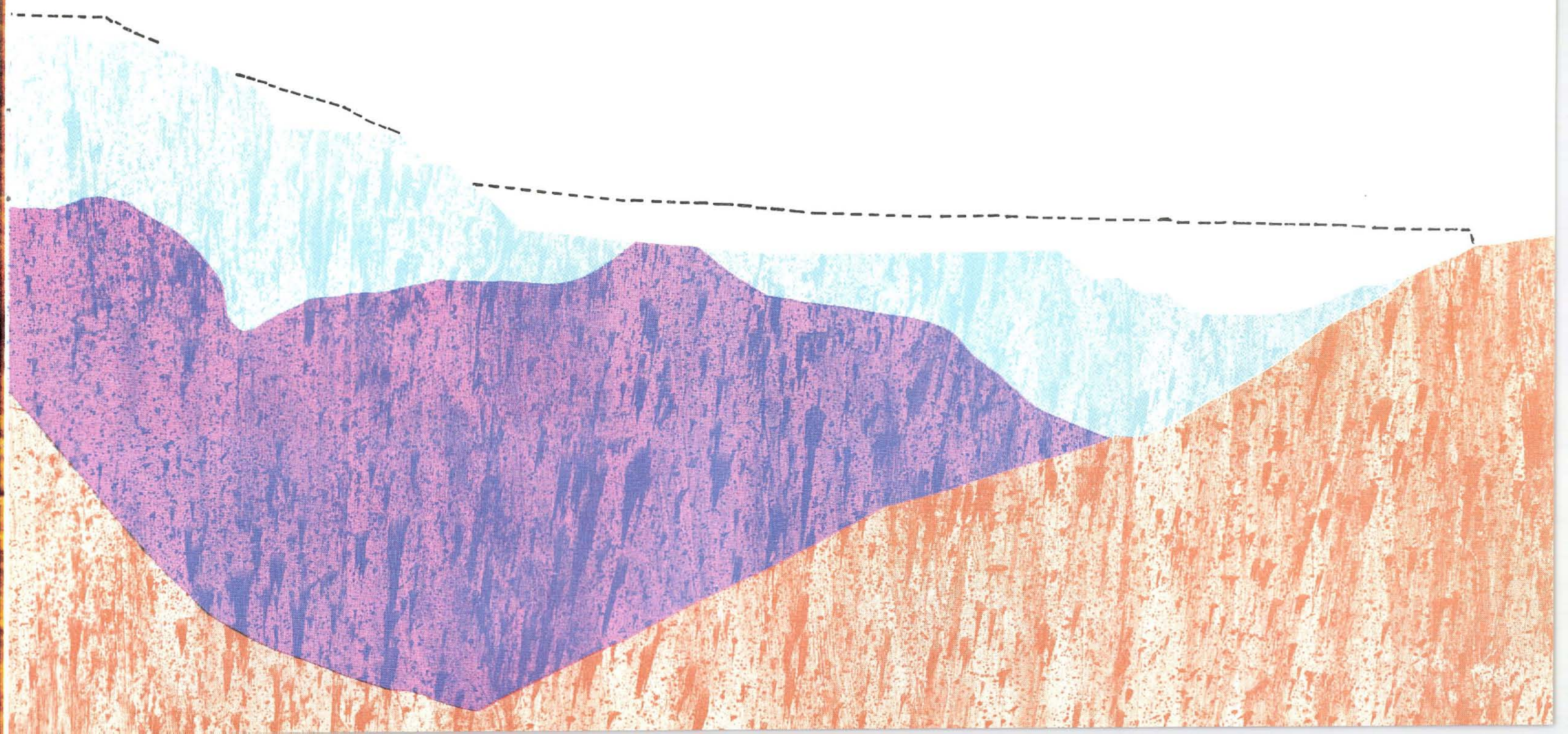
# Financial Summary*
## 1971/1967

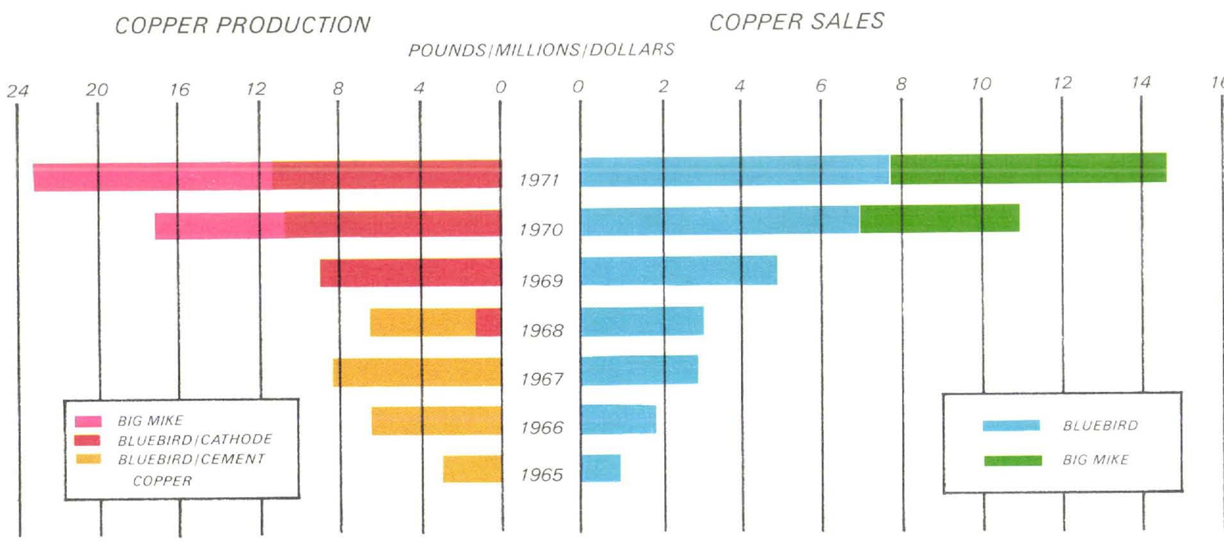
| Fiscal year ended June 30 | 1971 | 1970 | 1969 | 1968 | 1967 |
|---|---|---|---|---|---|
| ANNUAL | | | | | |
| Net sales | $ 15,194 | $ 11,040 | $ 4,835 | $ 2,871 | $ 2,785 |
| Royalties – uranium | 724 | 611 | 739 | 887 | 956 |
| Other income | 158 | 276 | 138 | 22 | 81 |
| Total income | 16,076 | 11,927 | 5,712 | 3,780 | 3,822 |
| Net income from operations before income taxes | 1,102 | 2,665 | 714 | 338 | 974 |
| Provision for income taxes | 171 | 794 | 38 | (93) | 229 |
| Net income from operations | 931 | 1,871 | 676 | 431 | 745 |
| Extraordinary income (loss) net of applicable income taxes | 141 | (195) | -0- | 267 | -0- |
| Net income | 1,072 | 1,676 | 676 | 698 | 745 |
| Net income per share | | | | | |
| From operations | .61 | 1.25 | .49 | .35 | .61 |
| From extraordinary income (loss) | .09 | (.13) | -0- | .21 | -0- |
| Total | .70 | 1.12 | .49 | .56 | .61 |
| YEAR END | | | | | |
| Current assets | 5,140 | 9,110 | 2,861 | 1,992 | 2,348 |
| Current liabilities | 2,671 | 4,381 | 996 | 1,668 | 441 |
| Working capital | 2,469 | 4,729 | 1,865 | 324 | 1,907 |
| Net property, plant and equipment and other non-current assets | 13,936 | 13,774 | 9,968 | 5,224 | 926 |
| Long-term debt | 2,764 | 5,912 | 2,910 | 1,853 | -0- |
| Deferred income taxes | 1,375 | 1,300 | 440 | 405 | 248 |
| Net worth | 12,267 | 11,291 | 8,483 | 3,290 | 2,585 |
| Stockholders' equity per share | 8.03 | 7.37 | 5.76 | 2.62 | 2.07 |
| Number of shares outstanding | 1,528,120 | 1,531,552 | 1,473,616 | 1,253,712 | 1,250,388 |

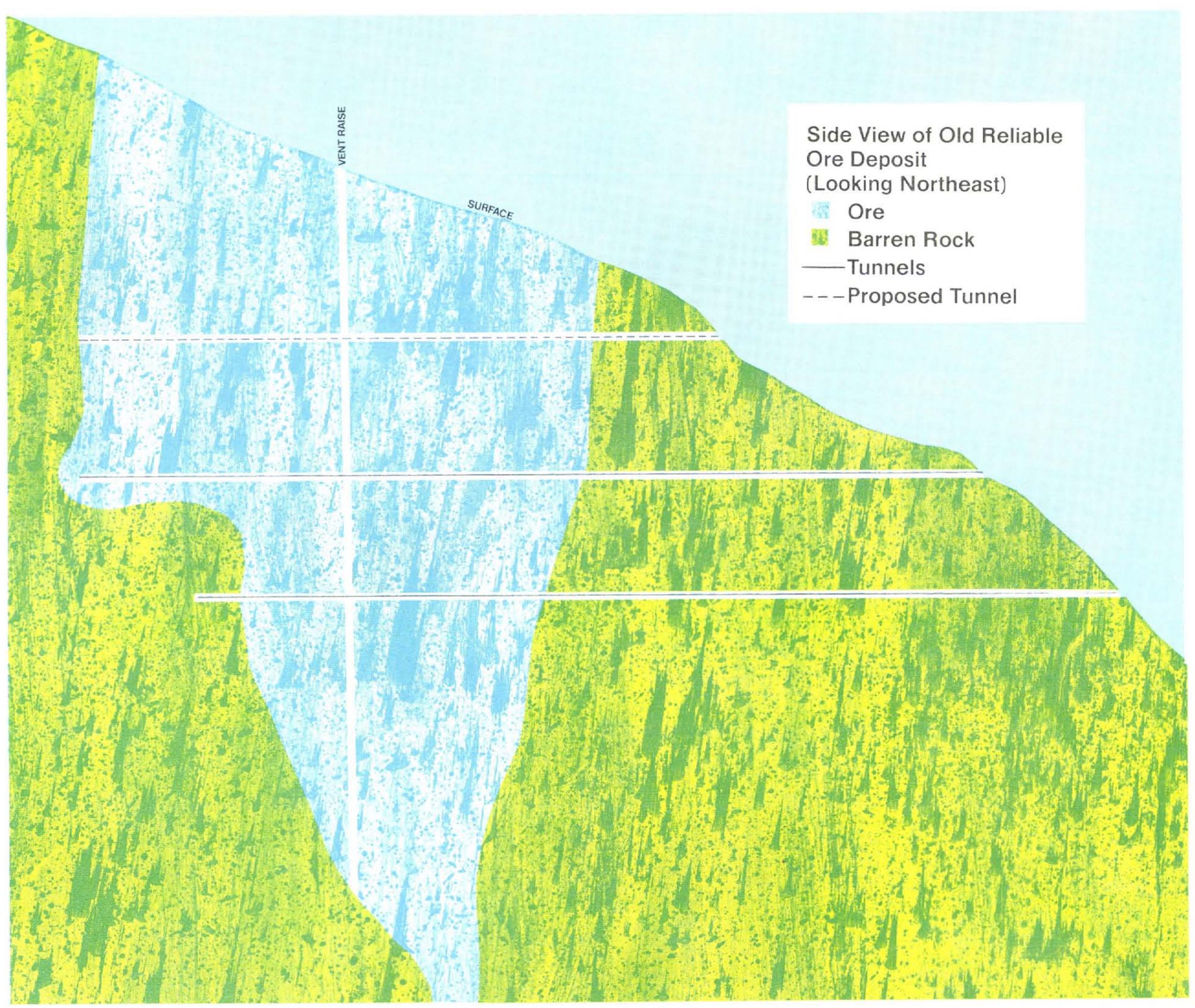
* (000 omitted except for per share and share amounts)
Per share amounts and number of shares outstanding have been adjusted to reflect the 2-for-1 stock split-up declared in March, 1970.



Washing electrolyte and acid from finished cathodes






Stacking cathodes in temporary storage prior to shipment

# TUNGSTEN

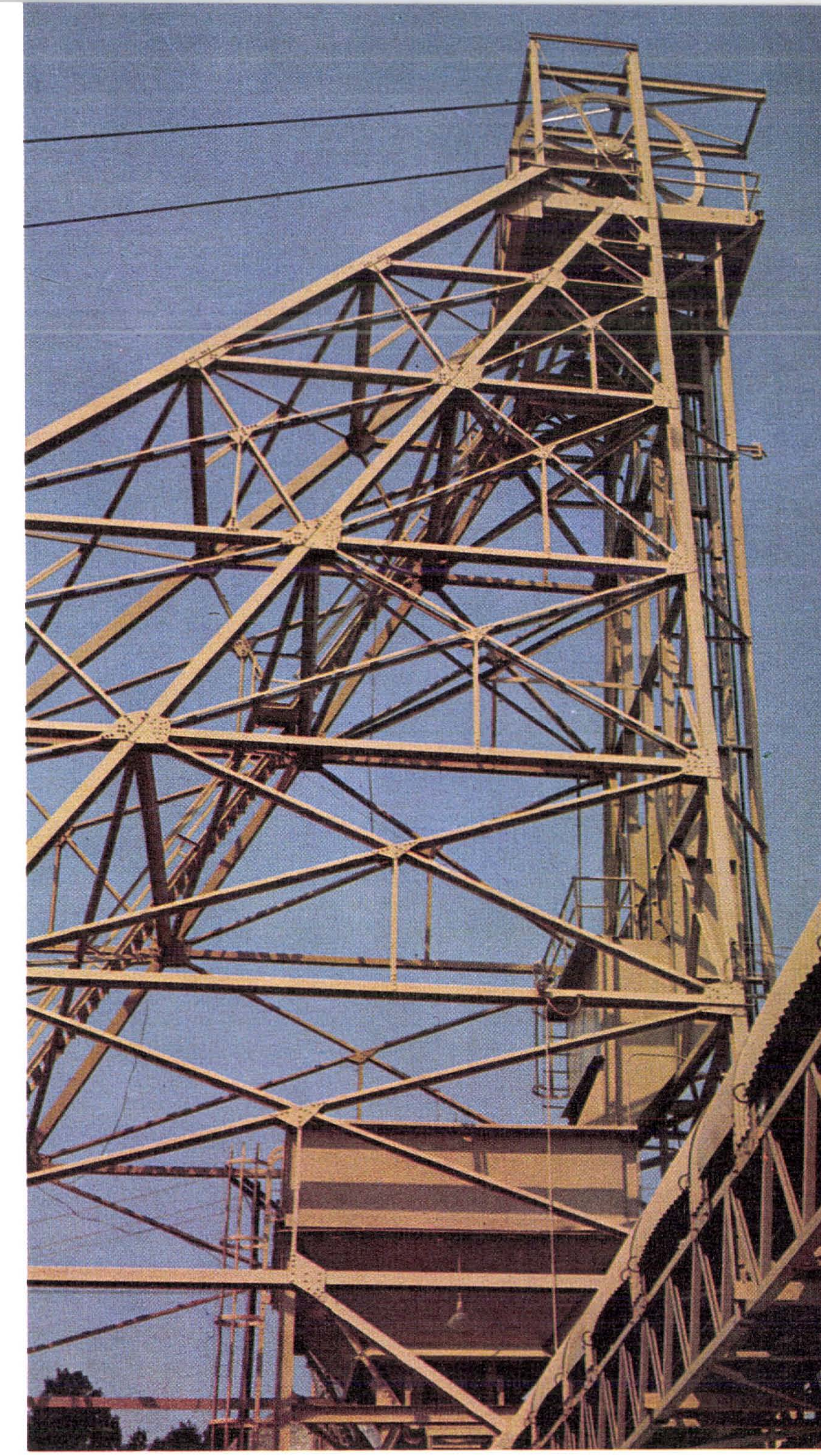
## Prices Fall, Mine on Standby

The Tungsten Queen Mine was placed on standby in August 1971, terminating operations approximately a year after initial production began. The Mine never reached a profitable level during the year, with mining and milling problems hampering operations during much of the period, and a subsequent sharp decline in tungsten prices finally prompting a decision to halt operations even though many of the earlier difficulties had been largely resolved.

Limited production began on the property in late August 1970, and by mid-November the Mine was producing at about 60 percent of its initial design objective of 600 tons of ore per day. Output continued to rise during the second quarter of the fiscal year, but considerable difficulty was experienced in recovering tungsten from the ore. This problem continued throughout the third quarter and early part of the fourth quarter, and in late May a decision was made to reduce production until recovery could be increased. In the meantime, the market for tungsten began to soften, reaching a low of $39 per short ton unit (STU) in July, 1971, a decline of 43 percent from the $68.50 per STU which the Company had received for production through December 1970.

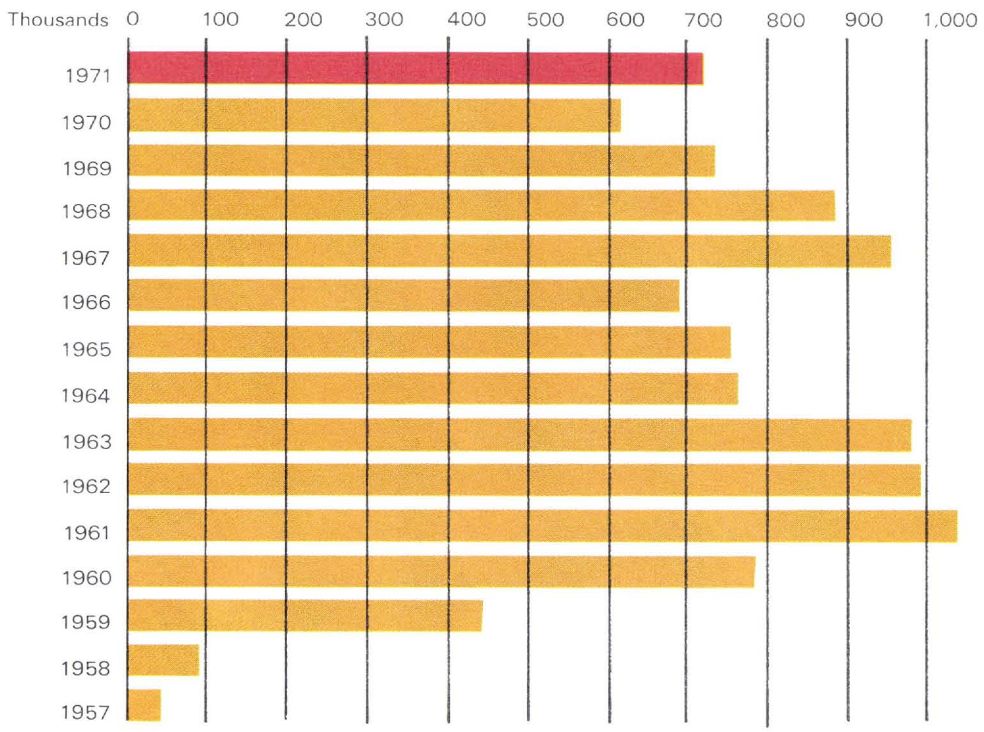
Considerable progress was made in milling in June, with recovery rising from 60 percent to about 80 percent – very near the total recovery projected for the mill. Mining costs also declined significantly during the month, primarily as the result of the use of more experienced mining personnel.

Despite these improvements, the property continued to operate unprofitably as the price of tungsten declined. This prompted the decision to place the Mine on standby rather than to deplete reserves to sustain a losing or marginally profitable operation. The current price of tungsten is largely a result of the economic recession experienced worldwide in 1970-71. An improvement in industrial production should eventually result in a rise in tungsten prices, and may enable the Company to resume operations at the Mine.

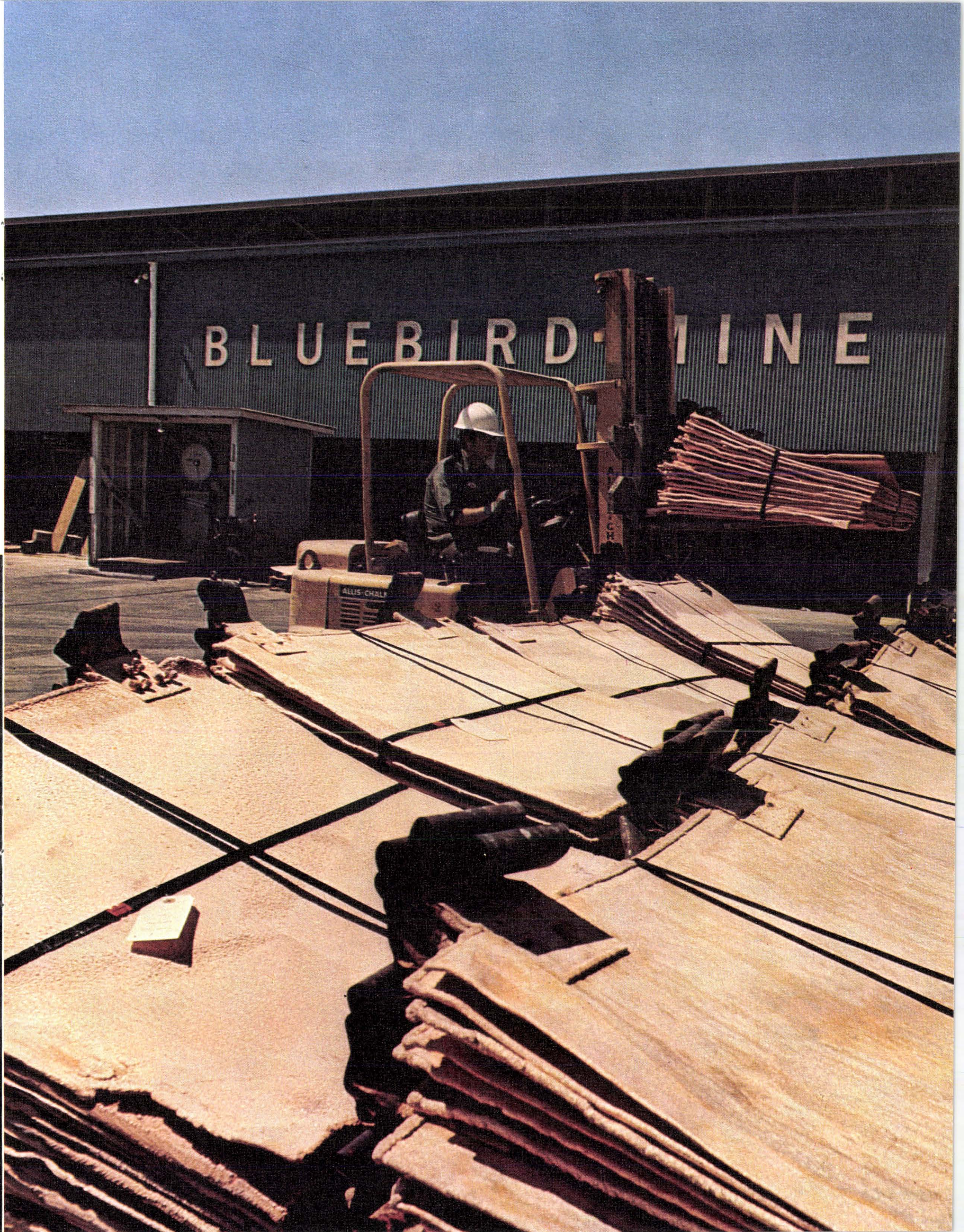


Tungsten Queen headframe and ore conveyer

URANIUM
ROYALTIES
1957/1971




Uranium driller at sundown



# URANIUM

## Market Outlook Improves; Venture Ends Third Year

The Company made satisfactory progress in its uranium operations during the year – royalties increased, the market outlook for $U_3O_8$ improved, and the joint venture with Houston Natural Gas and Combustion Engineering completed its third and final year of drilling.

Royalties from properties in northwest New Mexico totaled $724,341, an increase of about 19 percent over the $611,118 received last year. The increase, which is expected to continue into 1972, reflects the slightly higher price received for $U_3O_8$.

The joint venture drilled 266,000 feet during the year, including about 93,000 feet to further define the Section 7 deposits in Ambrosia Lake. Reserves there stand in excess of 300,000 tons of high grade ore. Preliminary engineering and mine planning will be conducted on the property during the current fiscal year. Substantial funds remaining in the joint venture will be used for property acquisition and further exploration.

The nation's growing need for safe, economic sources of energy continued to brighten the long range market outlook for uranium. In the first six months of 1971, electric utilities announced plans for 16 nuclear power plants, compared to 14 plants ordered during all of 1970, and seven in 1969. As of June 30, 1971, there were 22 nuclear power plants in operation in the U.S., 55 under construction, and 44 planned.

Exploring for uranium on Section 7