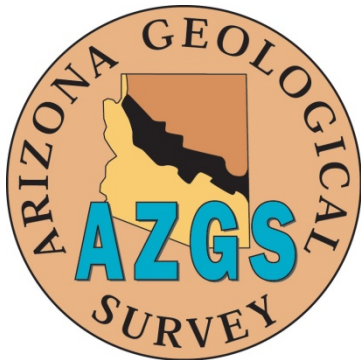




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James Doyle Sell Mining Collection

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AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

May 16, 1969

FILE MEMORANDUM

Bluebird Mine
Miami, Arizona

Mr. Ken Powers, Manager of Bluebird (Rancher's Exploration) gave a talk on "Solvent Extraction and Electro-winning of Copper" at the May 14 meeting of the Tucson Sub-Section, AIME. The mine property adjoins Inspiration on the West.

In solvent extraction, the aqueous pregnant solution from the leach dumps is mixed with an organic---Lix 64---which absorbs the copper. The mixture is settled, the organic rising to the top. The PH of a portion of the stripped solution is lowered by addition of acid and then again mixed with the organic which is divested of its copper by the more acidic aqueous solution---raising the copper content from the original ± 3 gms per liter to ± 30 gms per liter. The remainder of the stripped solution re-enters the leach circuit.

The next step is to pass the enriched solution through flotation cells, skimming off the last traces of organic. This is followed by conventional electro-plating on copper cathodes. The product is 99.9% pure. (They are working on the 4th "9").

The ore is mined by ripping the pit floor with scraper transportation to the dumps where it is deposited in a layer 20' thick. After leaching, another layer is put down, etc:

The copper occurs as carbonate (Azurite), silicate and sulphate (?) in granite principally. Some ore is in schist.

Mining rate: Ore - 5000 tpd
Waste - 2000 tpd

Head grade: 0.50% Cu

Recovery: 85% plus

Production: 30,000 lbs/day

main mineral

5/16/69

Acid (H_2SO_4) consumption: 3 to 7 lbs/lb Cu.

Plant Cost: \$3,000,000

Cost of production: $\pm 20¢/lb$ Cu (not specified)

Mine life: 8 years

Obviously, the Bluebird operation extracts the copper at a much higher rate than conventional dump leaching and at a much lower cost than vat leaching. The friable nature of the ore and the ready solubility of the copper minerals are apparently two important factors. Also, since there are no iron sulphides in the ore and iron is not used as a precipitant, there is no build up of iron either in the solutions or in the dumps, as in conventional leaching practice.

JHC:lzb

J. H. Courtright
J.H. Courtright

cc: JJCcollins
WESaegart
LPEntwistle
JRWojcik
RDKarvinen
BEKilpatrick
SEZelenkov
SRDavis
NPWhaley
RHLuning
JDSell
PDBauer

Ranchers' recovers Bluebird oxide copper by solvent extraction

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AMERICAN SMELTING AND REFINING COMPANY
TUCSON ARIZONA

J. H. C.

January 17, 1974

JAN 18 1974

FILE MEMORANDUM

Bluebird Mine
Arizona

file

Following information obtained from Steve Potter:

Ore Reserves: 75-125 million tons @ 0.5% oxide copper

Waste:Ore: $\approx$ 1.6:1

Ore dips west at approx. 45° and cutoff on west by 45° eastward dipping fault.

Present Heap Leaching recovers about 40-50% of the copper on a running basis. (No estimate of what ultimate overall recovery may be with heap leaching.)

Deposit is rippable to bottom, so cheap mining cost can be obtained through life of the mine.

Ranchers would consider partner if partner would study feasibility of going to some type of vat leaching -- hopefully leading to 90% recovery and increased daily tonnage mined.

W. L. Kurtz
W. L. Kurtz

WLK:lb
Attach.

cc: TC Osborne - w/attach.
JH Courtright "
RBCrist "
JDSell "
NVisnes "
RB Meen "

UNITED STATES AIR FORCE BUREAU OF AERONAUTICS

Mr J H Condit

RECEIVED

SEP 7 1971

EXPLORATION DEPT.
J. H. C.

SEP 7 1971

file Bluebird Mine
Miami, Ariz

Amer Nat Hist

8-31-71

JHC

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

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cc JJCollins
WESaegart
LPentwistle
JRWojcik
RDKarvinen
BEKilpatrick
SEZelenkov
SRDavis
NPWhaley
RHLuning
JDSell
POBauer

