CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
1520 West Adams St.
Phoenix, AZ 85007
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

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Arizona Department of Mines and Mineral Resources Mining Collection

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PRINTED: 12/17/2002

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: CHARLESTON ROAD MILL

ALTERNATE NAMES:
- ALANCO CUSTOM MILL
- ARMCO MILL
- TOMBSTONE MILL
- ARIZONA MINERAL RESOURCES MILL

COCHISE COUNTY MILS NUMBER: 730

LOCATION: TOWNSHIP 20 S RANGE 22 E SECTION 21 QUARTER NW
LATITUDE: N 31DEG 40MIN 58SEC LONGITUDE: W 110DEG 06MIN 20SEC
TOPO MAP NAME: TOMBSTONE - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
- MILL GRAVITY
- MILL CYANIDE
- MILL FLOTATION

BIBLIOGRAPHY:
- ADMMR CHARLESTON RAOD MILL FILE
- MILL HAS GRAVITY, CYANIDE AND FLOTAION

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

Date of Information: 04/28/93 By: Nyal J. Niemuth, Mining Engineer

Information from:	Donald Littlejohn
Company:	Armco Milling and Smelting
Address:	2160 E. Fry Blvd., Box 508
City, State, ZIP:	Sierra Vista, AZ 85635
Phone:	602-457-2221
MINE:	CHARLESTON ROAD MILL
ADMMR Mine File	CHARLESTON ROAD MILL
County:	Cochise
AzMILSNumber:	730

SUMMARY

Donald Littlejohn reports he has bought the Charleston road mill (aka ARMCO Mill) custom milling facility from ALANCO. The facility now operates under the name of Armco Milling and Smelting. The above address is the mailing address, the mill and laboratory remain on Charleston Road 3.5 miles west of Tombstone. Gary Lindroos an Arizona registered assayer is on staff and performing assaying for the public.

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

VERBAL INFORMATION SUMMARY

1. Mine file: ~~ARMCO CUSTOM MILL~~ Charleston Custom Mill
2. Mine name if different from above:
3. County: Cochise
4. Information from: Larry Kersey

   Company: Alanco Ltd.

   Address: 7345 E. Acoma Dr.

   Scottsdale, AZ 85260

   Phone: 991-8540

5. Summary of information received, comments, etc.:

Larry Kersey reports they have leased the Armco mill to the CRTI Group of Seattle, Washington, contact person Richard McCullum. Apparently CRTI has an agreement with a Mexican precious metal mine. They plan to import the ore and process it at the Armco mill.

Date: 2/9/89

Nyal J. Niemuth, Mining Engineer

Charleston Road Mill file
Cochise

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1992

ALANCO LTD.
Office
14555 N. Scottsdale Road, Suite 200, Scottsdale, AZ 85260 - Phone 991-8540.
Chairman of the Board Richard Jones
President Kevin Jones
Vice President Larry Kersey
ARMCO Custom Mill T20S R22E Sec. 21
Located 4 miles east of Tombstone on Charleston Road - Custom milling facility - Gravity, flotation, and CCD circuits.

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1991

ALANCO LTD.
Office
14555 N. Scottsdale Road, Suite 200, Scottsdale, AZ 85260 - Phone 991-8540.
Chairman of the Board ..... Richard Jones
President ..... Kevin Jones
Vice President ..... Larry Kersey
ARMCO Custom Mill T20S R22E Sec. 21
Phone - 457-2231 - Located 4 miles east of Tombstone on Charleston Road - Custom milling facility - Gravity, flotation, and CCD circuits.

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1990

ALANCO LTD.
Office
14555 N. Scottsdale Road, Suite 200, Scottsdale, AZ 85260 - Phone 991-8540.
Chairman of the Board ..... Richard Jones
President ..... Kevin Jones
Vice President ..... Larry Kersey
ARMCO Custom Mill T20S R22E Sec. 21
Phone - 457-2231 - Located 4 miles east of Tombstone on Charleston Road - Custom milling facility - Gravity, flotation, and CCD circuits.

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1989

ALANCO LTD.

Office
7345 E. Acoma Drive, Scottsdale 85260 - Phone 991-8540.

Chairman of the Board ..... Richard Jones
President ..... Kevin Jones
Vice President ..... Larry Kersey

ARMCO Custom Mill T20S R22E Sec. 21
Phone - 457-2231 - Located 4 miles east of Tombstone on Charleston Road-
Custom milling facility - Gravity, flotation and CCD circuits.

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1988

ALANCO LTD.

Office
7345 E. Acoma Drive, Scottsdale 85260 - Phone 991-8540.

Chairman of the Board ..... Richard Jones
President ..... Kevin Jones
Vice President ..... Larry Kersey

ARMCO Custom Mill T20S R22E Sec. 21
Located 4 miles east of Tombstone on Charleston Road - Custom milling facility temporarily on stand by.

COD T23N R17W Sec. 33
Located 15 miles northwest of Kingman - Employees 5 - Underground base/precious metal mine - Under development.

Manager ..... Chuck Porter

ARIZONA METALLURGICAL & REFINING CO.

This facility is a precious metal processing facility located at Tombstone, Arizona. The facility is located in four 5 acre mill sites, located some 3.5 miles south-west of Tombstone.

The plant, which has a present capacity of 75 to 100 tons daily, has an expansion capability of 500 to 1,000 tons daily as ore supply demands justify.

The refining capability is 10,000 ounces monthly, with expansion to 50,000 ounces monthly.

The processes employed are unique in that selective gravity concentration techniques are used with all tailings being treated by hydrometallurgical systems.

The concentrates, generally sulphide and complex, are treatable in reduced quantity, by the ratio of concentration from crude ore. The precious metals are extracted from these concentrates with the residue being sold on the open market to conventional sales outlets (smelters).

The systems employed allows the maximum extraction of the precious metals, which is refined to bullion (.999) at the facility.

The facility also offers full mill testing programs, which will incorporate the "Eco-tech" test program for recovery of volitile minerals (mercury, platinum and submicron size gold and silver).

ARMCO MINE

STATE MINE INSPECTOR

FEB 15 1984

Sena

start

Office of State Mine Inspector

705 West Wing, Capitol Building
Phoenix, Arizona 85007
602-255-5971

NOTICE TO ARIZONA STATE MINE INSPECTOR

In compliance with Arizona Revised Statute Section 27-303* we are submitting this written notice to the Arizona State Mine Inspector (705 West Wing, Capitol Building, Phoenix, Arizona 85007) of our intent to start/stop (please circle one) a mining operation.

COMPANY NAME ALANCO LIMITED

CHIEF OFFICER RICHARD JONES

COMPANY ADDRESS 4143 N. 12th STREET, PHOENIX, AZ. 85014

COMPANY TELEPHONE NUMBER 602 264 1244

MINE OR PLANT NAME ALANCO LIMITED

MINE OR PLANT LOCATION (including county and nearest town, as well as directions for locating by vehicle)

COCHISE COUNTY, TOMBSTONE, ARIZONA

THREE AND ONE-HALF MILES SOUTH ON CHARLESTON ROAD FROM TOMBSTONE

TYPE OF OPERATION MILLING PRINCIPAL PRODUCT GOLD - SILVER

STARTING DATE ASAP CLOSING DATE

DURATION OF OPERATION INDEFINITE

PERSON SENDING THIS NOTICE DONALD GELSINGER

TITLE OF PERSON SENDING THIS NOTICE SAFETY DIRECTOR

DATE NOTICE SENT TO STATE MINE INSPECTOR FEBRUARY 14, 1984

*A.R.S. Section 27-303 NOTIFICATION TO INSPECTOR OF BEGINNING OR SUSPENDING OPERATIONS: When mining operations are commenced in any mine or when operations therein are permanently suspended, the operator shall give written notice to the inspector at his office prior to commencement or suspension of operations.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Alanco Mill, Tombstone

Date June 16, 1983

District Tombstone Cochise County

Engineer Ken A. Phillips

Subject: Charleston Road Mill

other references: Alanco Ltd. (company) file

KAP

On the above date a visit was made to the Alanco Ltd. Mill south of Tombstone on the east side of the Charleston Road at the same sight as the old Tombstone Mineral Reserves plant. This facility is reported to be operated by Arizona Metallurgical and Refining Company, an Alanco subsidiary.

The mill site contains a mineral processing beneficiation plant, an equipment storage yard, an air pollution demonstration plant, an assay laboratory, an extractive metallurgy laboratory and a precious metal refinery.

The mill (mineral processing - beneficiation plant) has been set up primarily for custom processing-milling. Plant consists of primary jaw crusher, secondary rolls, 4 x 6 ball mill, rake classifier, 2 concentrating tables in series, a bank of 8 floatation cells, (no conditioner), concentrate thickener, drum filter and a separate small agitation cyanide plant with a Merrill Crowe precipitation plant. At the mill a new crushing plant is being installed, a 5 x 8 ball mill is being added for primary grinding and the current 4 x 6 mill will be used as a regrind mill. A larger agitation leach plant is being constructed to replace the small pilot plant. It was suggested the current leach tanks be incorporated ahead of the floatation cells for pulp conditioning.

Laboratory facilities are available for fire assay, wet chemical analysis and spectrographic analysis. Additionally the lab contains laboratory size equipment for concentration table tests, cyanide leach tests and floatation tests.

Electrolytic cells and melt furnances are available for refining and/or smelting precious metal precipitates.

The air pollution control demonstration unit is not directly related to the mineral processing activities of the facility. It contains a system developed by Ecotech, a firm which Alanco Ltd. is reported to have bought out.

cc. Susan

ARIZONA MINERAL RESOURCES, INC.

Charles Simpson for buyers of lead-silver ore from prospect north of Apache Junction. Hillside Mining Company of Apache Junction will mill ore but Mr. Simpson has doubts of recovery. FTJ WR 4/2/75

There is no one at the old Tombstone Mineral Reserves mill (now associated with Arizona Mineral Resources Co.) VBD WR 5/13/75

[redacted]

[redacted]

[redacted]

[redacted]

Arizona Abandonded Mine Program

CHARLESTON ROAD MILL (+) COCHISE

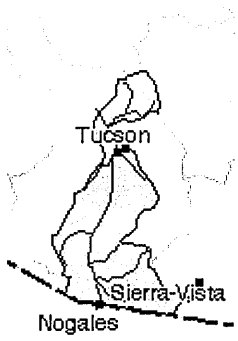
The BLM is committed to minimizing physical and environmental hazards associated with abandoned mines in Arizona. In the mid-1990's, the BLM began inventorying abandoned mines on BLM-managed lands. Arizona's inventory was conducted by the Arizona State Mine Inspector's Office (ASMI) with funds and equipment provided by the BLM from its mining law and hazardous materials management programs. The inventory focused around population centers or areas where there is a high potential for recreational use. At the conclusion of the inventory, approximately 35 percent of the public lands managed by the BLM was inventoried. Projections from the ASMI inventory suggest that there may be as many as 27,000 abandoned mine features in Arizona. Many of these mine features consist of relatively insignificant features such as shallow trenches and small exploration pits, many pose physical and environmental hazards which will require some form of remediation or closure.

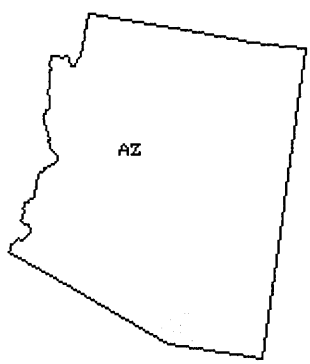
Arizona Watersheds

Depicted below is a map of Arizona watersheds. This map may be viewed on the Environmental Protection Agency (EPA) website.

Key Watersheds

The Charleston Lead Mine and the Armco Mill Site are both within the Upper San Pedro River watershed. Runoff from these sites flow into the San Pedro National Riparian Conservation Area. Shown below is the Upper San Pedro River watershed, along with its location within the Arizona State boundaries.





List of Arizona AML Projects

The Charleston Lead Mine		Map Key: Identifier: 15050202 on watershed map of Arizona.
Watershed: Upper San Pedro River	Start Date: 5/2000	Last Update: 2/2001
Contact: Byard Kershaw	Tel No: (602) 417-9348	E -Mail: byard_kershaw@blm.gov

The Armco Mill		Map Key: Identifier: 15050202 on watershed map of Arizona.
Watershed: Upper San Pedro River	Start Date: 6/2000	Last Update: 2/2001
Contact: Byard Kershaw	Tel No: (602) 417-9348	E -Mail: byard_kershaw@blm.gov

Last modified 03/22/2001 09:33:22

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PO Box 45155
222 N. Central Avenue
Phoenix, AZ 85004
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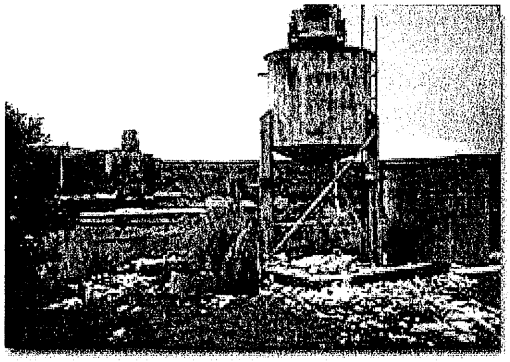
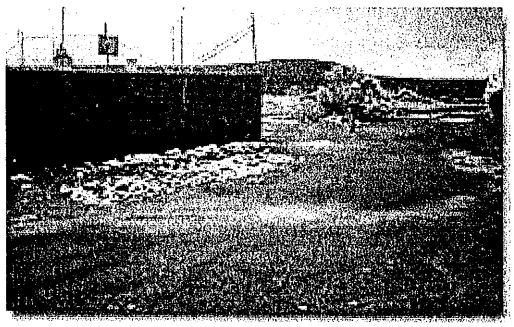
Armco Mill Site



The Armco Mill Site presents a significant environmental hazard to the Upper San Pedro watershed (HUC 15050202). Portions of the San Pedro River are within the San Pedro River National Riparian Conservation Area (RNCA). The San Pedro River is one of the few perennial rivers in the deserts of southern Arizona. The site consists of a twenty acre compound surrounded by a barbed wire fence. It contains a five-cell cement heap leaching structure, two hypalon-lined solution ponds, two PVC-lined tailings disposal ponds, two unlined tailings ponds, one laboratory waste disposal area. Additionally, a walled in area contains approximately 200 55-gallon drums containing ore tailings. An adjacent walled in structure contains a stockpile of ore tailings and is open on one end. The walled area has a cement floor and the walls are topped with razor wire. Also on site are miscellaneous pieces of milling and processing equipment, some of which are marked "Danger Cyanide." A mill building and milling equipment, metallurgical laboratory, crusher, conveyor, and water tanks have ben demolished and removed.



Known contaminants in the area of the mill site consist of arsenic, cadmium, chromium, copper, lead, mercury, silver, thallium and zinc. The eastern boundary of the RNCA is approximately 2 miles west of the site, and the San Pedro River is approximately 4 miles west of the site.

The RNCA was established because it is habitat to 8 threatened or endangered species including the Huachuca water umbel, Southwest willow flycatcher, jaguar, Lesser long-nose bat, Aplamado falcon, Mexican gray wolf, loach minnow, and spike dace. The RNCA receives 100,000 visitors per year. The mill site is adjacent to Highway 82, which is a well traveled route for residents of Huachuca City and Fort Huachuca, and travelers visiting the RNCA, and the historic town of Tombstone, Arizona. Also, approximately 10 to 15 miles to the northwest, the Arizona State Parks Department has established the Kartchner Caverns State Park, which also attracts tourists to the vicinity. While the site is fenced and walled, the site can be accessed without much difficulty.

As of the date of this narrative, approximately $8,000 have been spent. It is estimated that and additional $20,000 will be needed to complete the clean up, and the site is expected to be finished by the end of Fiscal Year 2002.

Last modified 03/19/2001 09:39:47

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Arizona State Office
PO Box 45155

Charlston Road Mill Cochise Couty

MG WR 11/16/84: Visited ARMCO custom mill (Alanco Ltd)in Cochise Co. The mill continues to agatate-leach, in closed tanks, the sulfide concentrates sent down from ALANCO-operated COD mine (Mohave Co). Mr. Lloyd Tracey, general manager, reports that the cyanide leach/zinc precipitation treatment recovers about 70% Ag and 90% Au from the concentrates containing abundant galena, pyrite, and sphalerite. Tracey states the COD mine ships about 20 tons of conentrates per week to the mill. The custon facility has an extensive array of leach pads and ponds on the east side of the property (behind the mill building). Some gold-silver ore from Mexico is being treated by heap leaching.

NJN WR 11/8/85: Larry Kersey (c) of Alanco Ltd. visited and discussed the company's plans to raise money for an expansion of their Armco Mill (Charleston Road Mill File) at Tombstone. They would like to have the capacity agitation circuits. In addition they would like to handle 250 tpd in their heap leach facility. The company feels now is a good time to acquire the equipment cheaply and would leave them in a good position for the next upward swing of the metals markets.

MG WR 9/12/86: Alanco reports that its Armco mill in cochise Co. is shut down and on standby. A watchman is on the property but there is no telphone.

NJN WR 4/15/88: Larry Kersey (card) of Alanco Ltd. (card) reported that the Groundhog Mine (file) Cochise County contains 200,000 tons of low grade silver with a little gold that could be economic with a slight rise in silver prices. They have recently completed their financing which will allow them $6 million to spend at the Charleston Road Mill (file) and Groundhog (file) Cochise Co. Immediate plans are to reopen the mill by processing some dump material and do custom milling, possibly on Mexican material.

CHARLESTON ROAD MILL

COCHISE COUNTY
T20S R22E Sec. 21

AKA: Alanco Mill; ARMCO Mill

See: Alanco Ltd. (file)

MG WR 6/19/80: Visited the inactive mill on the Charleston road south of Tombstone. This facility is apparently being equipped for "custom" milling. The mill was obtained by ALANCO Ltd., 960 West Grant Rd, Tucson, Arizona 85705, phone 888-5248, after the assets of the Tombstone Mineral Reserves were merged into ALANCO on June 14, 1980.

Narrow-Gage Scout of Casper, Wyoming issue June 1983 reported that Alanco has a small 25 to 30 ton per day gravity cyanide circuit near Tombstone that will handle high grade concentrates. The company is presently getting ore from Mexico. The mill is also being expanded to 200 tons per day.

MG WR 6/5/83: Visited the Alanco mill on Charleston Road, Cochise County. One of the employees, Mr. Art Garcia, told me the mill is still under construction. Alanco wants to purchase ores or to custom treat ores.

CJH Field Report: May 2, 1984: A visit to Alanco, Ltd. mill S.W. of Tombstone on the Charleston Road and a tour was conducted by Don Gelfinger of the company staff revealed the following equipment in place and almost ready for operation: 1) ore receiving bin, 2) belt conyeyors to 3) primary jaw crusher and 4) secondary gyratory, 5) crushed ore storage bins, 6) ball mill (about 6' X 10"), 7) two vibratory tables (Wilfley Type), 8) classifier (screw type), 9) bank of five flotation cells, 10) drum type vacuum concentrate filter (Dorr-Olier Type), 11) cyanide leach pad, and a 12) Merrill-Crowe recovery unit (3,500 gal./hr).

CJH WR 6/29/84: Received two property reports from Canuto Sena, Deputy State Mine Inspector (c). Copies will be sent to Phoenix office, ADMR. Mr. Sena also reported that Alanco in Tombstone is now processing Ag concentrates brought down from the C.O.D. mine north of Kingman.

Also Gardners Bay

Alaska

Here is one marking
in Yuma Co. Now!

BROCHURE

ARIZONA MINERAL RESOURCES

1974

624-0951

This is not an offering or sales prospectus and any presentation of this brochure is based on its content only and the Corporation does not assume any responsibility for statements other than that included in the brochure.

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ARIZONA MINERAL RESOURCES

INTRODUCTORY STATEMENT

ARIZONA MINERAL RESOURCES, an Arizona Corporation, with plant facilities and field office at Tombstone, Arizona and Executive Offices at Tucson, Arizona, offers an unusual field of endeavor in today's mineral activity.

The primary function of the Corporation is to offer to the mineral producer, metallurgical processing facilities which will allow an outlet for finished products for precious metals, base metals and industrial minerals. This facility, together with a full scale research facility for problematical materials, offers a full range assistance program in the marketing aspects of the mineral industry.

The introduction of this program at this time is many fold, but the primary reasons are:

1. Lack of sales outlets and processing facilities for crude ore, irrespective of grade or value.
2. Increase of metal and mineral prices to an alltime high.
3. Release of precious metals to ownership of United States citizens.

ARIZONA MINERAL RESOURCES, INC.

ORGANIZATION AND STRUCTURE

Arizona Mineral Resources, Inc., an Arizona Corporation, has been formed around substantial assets acquired under contract, together with the talents and abilities of staff members who represent a vast experience within the mineral industry.

The Corporate structure was so designed to allow participation of the key personnel for participation within the Corporate structure initially, which in turn, will insure their continued all-out efforts in the ansuing year. This is particularly applicable to those who have developed some of the hydrometallurgical procedures which are included in the mill design and process.

The capital structure of the Corporation has been set at 10,000,000 shares with a par value of $10.00 per share. The stock of the Corporation is common, with no preferential stock being included. All common stock enjoys full voting rights and equal distribution of dividends.

The Corporation maintains offices in Tucson and Tombstone, Arizona.

DIRECTORS AND OFFICERS

President

Charles H. Simpson of Phoenix, Arizona, has been elected to serve as President of the Corporation. Mr. Simpson has been responsible for the development of the hydrometallurgical processing, which is programed for metal recoveries by the Corporation.

Charles Simpson is a graduate of Multhnomah College in Business Administration, with having completed graduate work at the University of

Oregon. He is a veteran of World War II, having seen service in the Marine Corps in all three war theaters.

Mr. Simpson's development of hydrometallurgical techniques commenced in South America in the late 50's and early 60's and since that time he has been involved in research programs pertaining to mineral recovery and geological appraisal. Until the association with the Corporation, Mr. Simpson has been an independent consultant in the mineral field.

Mr. Simpson has several mineral processing patents, both domestically and abroad, together with several patents pending on mineral recovery, particularly on the noble metals and rare earth. Several technical papers and acknowledgment of services and commendations have been given and granted to Charles Simpson.

Charles Simpson will be responsible for the research and ore testing facility at the Corporation's plant near Tombstone, Arizona.

Vice-President

R. W. Henderson of Phoenix, Arizona has been elected to serve as Vice-President of the Corporation. Mr. Henderson is a graduate of the Phoenix College, Phoenix, Arizona and the University of Arizona, winning a degree in Geological Engineering.

He has been involved with oil, helium and mineral programs since 1964 in various capacities. The most recent of which was as an engineering assistant to an exploration company in the Tombstone area.

R. W. Henderson served with the United States Army Security Agency in

1966 through 1970, after which he completed his education.

Mr. Henderson's duties as Vice-President of the Corporation lie as coordinator between the research department and the production section.

Secretary-Treasurer

The position of Secretary-Treasurer of the Corporation is held by Anthony Lane of Tucson, Arizona. Mr. Lane has been involved in the mining industry since 1950, having held various managerial positions in Europe, the Middle East and the United States.

He obtained his formal education in England, holding degrees of Mining Engineering and Geology.

Mr. Lane has been active in mining in the Southwestern United States since 1957, prior to which he was involved in geological and geophysical appraisal of both mineral and oil properties.

Anthony Lane served on the Board of several exploration and mining companies as well as being President of a mining service company.

Mr. Lane will be responsible for the administrative controls of the Corporation, working in conjunction with the research and production schedules.

EXECUTIVE COMMITTEE

In addition to the Board of Directors, the Corporation has the advantage of an Executive Committee consisting of Charles Simpson, Anthony Lane and C. T. Henderson.

C. T. Henderson was selected for his practical experience in business management and procedures which have encompassed freight, oil and gas explor-

ation and mineral exploration.

PHYSICAL PLANT AND FACILITIES

The Corporation has entered into a Lease-Option Agreement for the purchase of mill and research facilities with Cochise Drilling Company, Inc.

These facilities are located 3½ miles southwest of Tombstone, Arizona, on the Charleston Highway.

The facility was designed by Mountain States Engineering Co. and it was planned to accommodate a 500 ton per day flotation plant. The construction completed at this time includes ore storage bins, primary and secondary crushing units, conveyor belt frames, assay laboratory building and a mill building.

The contract also includes the laboratory equipment and supplies which are located in the research facility.

The plant is located on 20 acres of land under a mill site entry. The land is also included in the contract agreement.

PROGRAMS AND SERVICES

The Corporation offers several programs which are being implemented at this time.

Research and Metallurgical Testing

The Corporation is continuing it's present program of offering metallurigical and ore processing services in an enlarged facility. The present testing, which has been undertaken, has been with particular emphasis to precious metal recovery from the difficult chemical combination ores.

This service is offered to all mineral concerns who are involved with problematical ores and those who are concerned with conversion of crude ores to finished products or saleable products.

At this time, the Corporation is completing metal recovery research on the following projects:

1. Silver-manganese ores - Tombstone Area.
2. Gold-telluride ores - Tortolito Mountain Area
3. Gold-silver ores - Oro Blanco Area
4. Copper, lead, zinc complex ores - Silverbell Area
5. Silver-vanadium-lead ores - Tombstone Area

The prime recovery systems which are being utilized are hydrometallurgical processes which have been developed by Corporation Staff Members. These systems, together with standard recovery systems, offer the maximum in metallurgical processing.

PILOT PLANT AND HIGH GRADE PROCESSING

A limited pilot plant is being designed to be installed in the research facility adjacent to the present assay laboratory. This plant is being installed to allow actual mill tests on a continuous basis and to allow metal recovery from the highgrade ore from producers.

This facility is designed to handle 5 tons per hour and will combine hydrometallurgical processing with limited gravity flotation equipment. The primary crushing will be completed in the existing facility with limited grinding being accomplished by ball mill.

This program is being introduced to allow small mine operators the facility whereby small highrade lots of ore containing precious metals can

be processed. The lots may range from several pounds of highgrade concentrate to several tons of lower value material.

ORE BUYING AND SALES OUTLETS

The Corporation also offers a sales outlet to the small producer for direct sale to the Corporation for small highgrade lots of material. The ores will be purchased based upon recoverable values. The purchase price will be controlled by the cost of processing, operating costs and margin of profit. The balance of the values will be paid directly to the producer.

This program applies to the precious metals. In some instances the program will extend to some base metals.

FULL MILL FACILITY

In the overall programming of the Corporation, full scale milling operations are planned as the need developes. The present plant facilities are designed for 500 tons per day capacity, which can be either reduced or enlarged as the need demands.

The full mill facility is designed for flotation, but this has been modified to the hydrometallurgical processes included in the program.

PROCESS LICENSING AND FRANCHISE USE

In some instances, the Corporation will arrange for the hydrometallugical processes to be used by licensees under firm contractual arrangements. This will involve the liquors being supplied to the licensee in the licensee's facilities. The pregnated solutions will then be transported to the Corporation's facilities for refinement.

DIBBLE REPORT

SUBJECT: "Simpson pper Leach Process"

Date : May 2, 1973

INTRODUCTION:

The Simpson leach process was basically developed in South America during the early 1960's. The process was developed by Simpson because of difficulties encountered in the conventional leaching of some of the High Carbonate Chilean ores. Because of political problems no commercial applications were made of the process by Simpson in South America, and he subsequently brought his accumulated technology back into the United States.

I became aware of the process during the early part of 1970 when Mr. Simpson performed a demonstration of a known difficult to leach ore. The results of this test work was sufficiently encouraging to me to warrant additional development work.

A 100#/hour test plant was established and operated for several months, that proved the viability of the process on a difficult to leach silicate ore. From the test plant was evolved sufficient data to perform preliminary engineering on a 100 TPD semi-commercial pilot plant. Unfortunately at this time the sponsor of the test work became very ill and had to retire from active participations in the development of the process.

SUMMARY:

The Simpson leach process is essentially a simple, very rapid agitation leach that uses conventional reagents and equipment. The unique features of the process are the reagent combinations and utilization of the recycling of partially stripped pregnant liquors to assist in the reactions with fresh feed. Also important to the processes success is the agitation stage that greatly improves contact of the solid-liquid phase and shortens the reaction cycle. Because of the speed of the reaction it is important that upon completion the pregnant liquor be stripped from the solid tailings as rapidly as possible by the use of a device such as a belt filter.

A summary of the results of our 100#/hour test plant showed that with a feed averaging 1.3% copper, we were able to extract approximately 80% of the copper in a reaction period of approximately 15 minutes. This was done at a projected cost of less than $0.09 per pound of copper, currently selling at $0.60 per pound.

The results indicated that by improving the filtering and washing sequence a significant increase in recovery could be made, lowering the production cost per pound.of copper produced. The applicable flowsheet for a 100TPD pilot plant was evolved out of our test work at 100#/hr.

CONCLUSIONS:

The laboratory results proved that the Simpson leach process had some unique features that warrant additional pilot plant work. The process is not meant to replace conventional leaching but to supplement it on mineral properties that are not compatible for either chemical or physical reasons to be leached by sulphuric acid. It should be noted however, that the techniques applied with the process toward copper are applicable toward leaching and recovery of other metals.

I have included a basic flowsheet showing what we feel would be an optimum starting point for the pilot plant. It should be noted that the basic flowsheet is so designed that it could be easily expanded to handle additional tonnages.

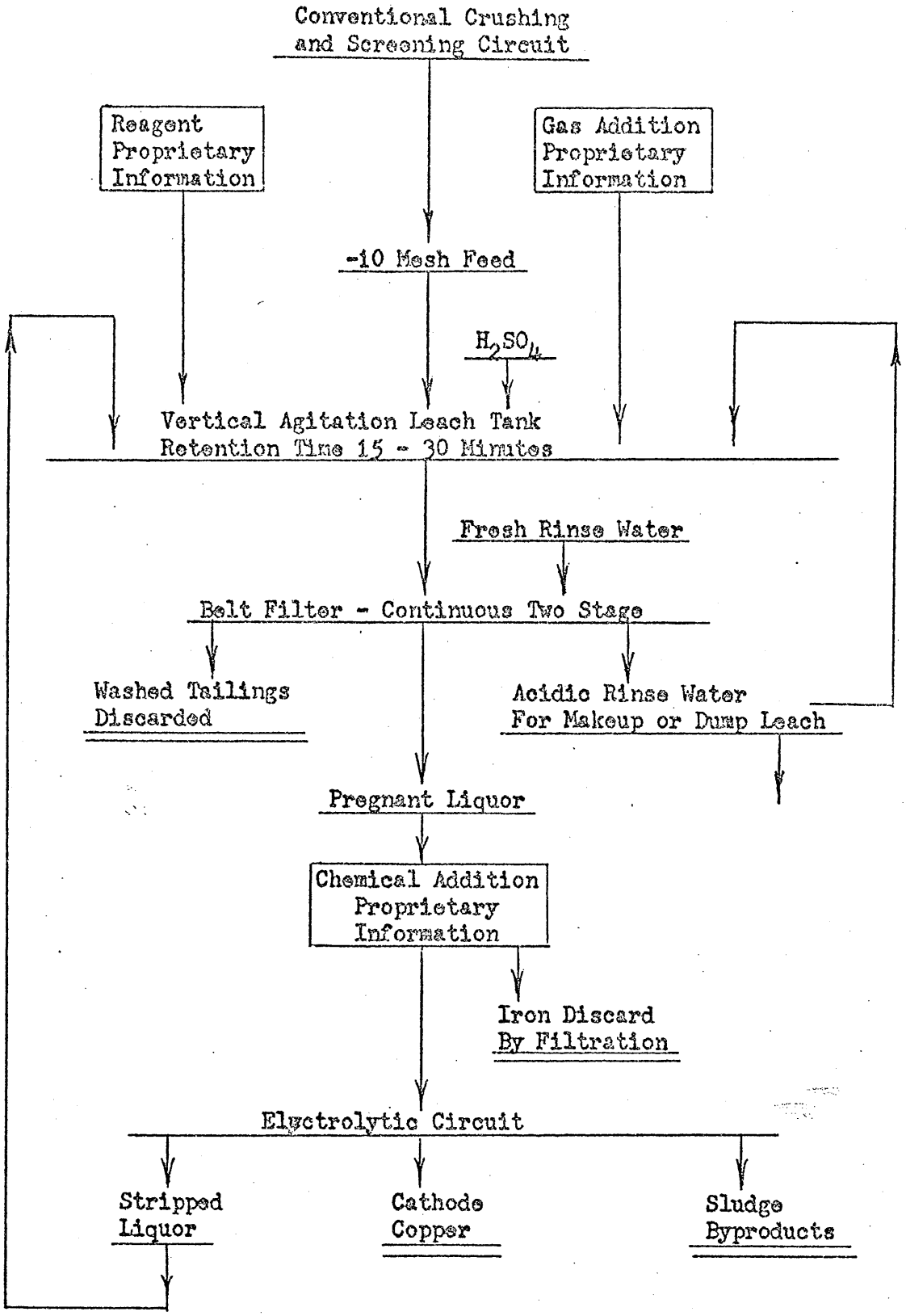
Respectfully Submitted,

M.F. Dibble

M. F. Dibble, P. E.

MFD/b

Simpson Copper Leach Pr[illegible]s - Proposed Pilot Plant Flow [illegible]et



RESUME :

M. F. Dibble, P. E.
Scottsdale, Arizona

Graduate: Michigan College of Mining and Technology; B. S. degree Metallurgical Engineering (Mineral Dressing option) 1962.

Registered as a Professional Engineer Mining, State of Pennsylvania.

1962-1963: Employed by American Metals Climax, Climax, Colorado Operated and evaluated molybdenum oxide recovery pilot plant. Plant used hydrocyclones and solvent extration techniques. Commercial plant constructed and operated successfully.

1963-1967: International Minerals & Chemicals Corporation., Bartow, Fla. Senior development engineer. Conducted flowsheet development studies for major phosphate producer. Patented processing flowsheet incorporated in $30,000,000.00 plant. Conducted all pre-design work. Supervised development laboratory. Conducted studies on all new process for corporation. Developed applicable flowsheets for all new phosphate properties.

1967-1971: Dravo Corporation, Pittsburgh, Pa. and Phoenix, Az. Senior Research Engineer and District Mining Engineer. Laboratory supervisor, evaluated all new beneficiation processes for Corporation, assisted in Engineering and design work related to a variety of beneficiation techniques. Was responsible for evaluation of all mineral prospects for Corporation on an international basis. Transferred to Phoenix, Arizona where exploration activity was expanded. Also assisted in contract mining activity for Corporation.

1971- Consulting Engineer, Scottsdale, Arizona. Designed, Engineered, constructed and operated own 50TPD copper flotation mill. Mill operated successfully. Conducted mineral property evaluation for various clients both in the United States and Mexico. Conducted various processing studies for clients. Have played a major role in the optioning of three porphyry copper prospects to major companies. Currently involved in two additional developments.

SPACE METALS, INC. REPORT

INTRODUCTION

The purpose of this report is to present a general view of the conventional processes which are used to leach copper ores and materials to produce primary copper and to bring to the attention of the industry the newly developed, economical, pollution free copper leaching process known as the Simpson Leaching Process.

The Simpson Process has been invented and developed by C. H. Simpson, and patents are now pending on a novel and unique method of producing a high purety copper direct from the most complex copper ores without the necessity of smelting.

The Simpson Process is significantly different from conventional processes in that it is a rapid way of extracting copper from copper oxides and silicates of a complex nature to produce a pure copper oxide suitable for reduction to pure metallic powder without the necessity of smelting.

Further work by Simpson on the process has demonstrated the feasibility of using variations of the Simpson method to recover substantially pure copper from copper scrap such as old motors, machine turnings and parts of old radiators. This process could be of a great economical advantage in reducing the pollution caused by discarded metal scrap today.

HISTORICAL BACKGROUND OF COPPER LEACHING

The Practice of extracting copper from low-grade ores and materials of a submill grade with sulfuric acid has been practiced throughout the world for many years. However, according to U.S. Bureau of Mines figures, the U.S. is the principal user of leaching processes to produce primary copper. In 1967 nearly 10% of the primary copper came from submill grade materials. In the mid 1960's this type of material accounted for 3% of the five million short tons of copper produced, or some 150,000 tons annually. By 1975 it is expected to increase fivefold, which roughly calculated should be 750,000 tons.

It is interesting to note here, that copper production from submill grade materials increased some 359% between the years of 1945 and 1960, while copper production from all other sources increased only 122%. The leaching of submill grade materials with sulfuric acid has remained almost as it was when the practices of leaching began, even though the industrial technology in other fields has expanded by leaps and bounds.

Recently attention has been directed toward a different type of ore deposit. Those of a smaller tonnage with higher grade and more complex materials not suitable for the conventional ore leaching practices, and those too small to pay for the huge investment required to install a large scale conventional leach plant.

It is this type of ore deposit which has been by-passed in the past, and that to which the Simpson Leaching Process is especially suited in its applicability, as will be more fully explained in other sections of this report.

The copper deposits in the developing countries are likely to be of the same general type as the U.S. deposits now being processed or which have been processed in the past. These include the high grade oxide-sulfide ores containing 5% or more copper that was formerly smelted directly and these ores which have been leached by the various processes mentioned above.

Although there may be some exceptions, without a doubt most of the starting or beginning copper production in the developing countries are likely to be small in terms of world copper production. Also, in the absence of established smelting industry, alternatives must be found to reduce the ores to metallic copper. This is where the Simpson Process could be utilized to an advantage.

The growing concern with environmental pollution problems, connected with the conventional smelting technique and the necessity to control such pollutants as sulfur dioxide has prompted the development of a pollution free copper process which produces metallic copper directly from the ore without the necessity of smelting.

In addition the Simpson Process could be used to alleviate or greatly reduce the surplus of scrap copper, mixed with other metals, by extracting pure copper and other metals chemically from material which is necessary to melt down or smelt today. The use of the Simpson Process in this way would have several economical benefits. First, it would aid in cleaning up unsightly junk yards; second, it would reduce the pollution effect on the ecology of the solids; third, reduce the emissions going into the air from the smelting or burning of these materials to recover the copper; fourth, it would produce copper and by-products directly from the metals or scrap chemically; fifth, and not the least, it would conserve the natural resources by making it unnecessary to take from the earth those metals that can be reclaimed and recycled by such a process.

INVESTIGATION REPORT ON THE RECOVERY OF COPPER FROM SEVERAL DIFFERENT COPPER ORES USING THE SIMPSON PROCESS

By

Gerhard G. Luell

Space Metals, Incorporated

2040 Fortune Road

Salt Lake City, Utah

June, 1971

ABSTRACT

Laboratory research has demonstrated that copper can be extracted and purified from almost any copper bearing ore using a special developed leaching and reducing technique. This process should enable producers to prepare a directly marketable copper powder by means other than smelting and electrolytic purification.

According to reports of the Bureau of Mines the total copper production from mines in the United States exceeds one million tons annually. A significant portion thereof has been derived from leaching and precipitation operations.

Copper powders can be produced in many ways, but most commercial production is effected by a reduction of copper oxide or by electrolytic precipitation.

Particle shape, grain size, and grain structure usually vary with the method of preparation and are important to the performance of the powder during processing and to the properties of the finished product. Thus, pressing and sintering operations often differ, depending upon the nature of the copper powder used, clear-cut specifications for copper powder are non-existing.

Volatile constituents in the copper powder such as sulfur or chlorine should be as low as possible, because an acid condition might be created during sintering that would result in corrosion.

Apparent density of a copper powder must be uniform because most commercial operations use a volumetric method for filling each mold. Apparent density is indirectly related to the flow characteristics, particle-size distribution, and porosity of the individual particles, low apparent densities may indicate porosity or voids within the powder particle.

In general, if the copper powder is to be used in a pressing and sintering operation, its chemical composition is less important than its physical properties. The percentage of allowable impurities varies, depending upon chemical nature. For example, the deleterious effect of oxygen as an impurity varies widely, thus surface oxide does not greatly interfere with the molding operation, while occluded oxide generally will result in a product of low tensile and impact strength.

REPORT ON A SPECIAL COPPER LEACHING PROCESS

Introduction

This investigation by Space Metals, Inc. was undertaken to develop information on extractive metallurgy of different kind of complex copper ores.

A special, S-A (salt-acid) process was used in this research work. The basic information received so far are indicating that this particular leaching technique has a definite potential.

The work was done mainly on copper ores which are not amenable for regular, conventional copper leaching procedures.

Samples of various copper ores were used in the exploratory research work such as:

Azurite, Chrysecolla, Carbonates, Malachite, High-Aluminum, and Copper Sulfide ores.

The major effectiveness of this particular leaching process is based on the creating of nascent hydrochloric acid in the reaction vessel. This powerful acid combined with heat is able to break almost any kind of copper bearing ore down.

Leaching Tests

Leach tests were made on samples of ore that had been crushed and ground to a nominal 8-mesh particle size because early trials showed that copper extraction decreased with a coarser grind and was not improved on more finely ground ore. All the salt was added at the beginning of the test. A slurry of about 50 percent solids at the start of the leach yielded better copper extraction than slurries containing either higher or lower solids. The slurry was mixed with a variable-speed motor stirrer at a speed sufficient to suspend the solids. The temperature of the mixture was adjusted to a specific degree and acid was introduced by a special feed device. The created exotherm heat raised the reaction temperature from approximately 89° to 99° centigrade.

After 15 minutes leaching under reflux the pulp was filtered on a preheated buchner funnel. The cake was washed with 0.1% hydrochloric acid solution and later with hot water. Tests showed that all soluble salts were removed by this washing procedure.

Data showing the influence of acid-salt quantity, time, and temperature on co-current leaching of copper ores are given in table 1. The percent of extraction calculations were based on analyses and quantities of leach solution and residues.

Copper Precipitation

Preliminary tests of copper precipitation indicated that the techniques used in replacing copper in a pregnant solution is effecting the characteristics of the copper powder. Therefore the precipitating procedure of copper should be studied carefully.

A small sample of 99.1% purity of copper powder could be produced by pre-oxalating, redissolving and precipitating, and finally sintering.

Conclusions

The test data show that it is technically feasible to extract copper from complex ores which are not amenable to regular conventional leaching techniques. An economical, as well as a production cost statement is attached to this preliminary report.

Respectfully submitted by

Gerhard G. Luell

May 26, 1971

Pilot Plant: 100 tpd of 1.2% Cu
Estimated P & L Proforma Statement

100 tons 1.2% ore contains		2,400 lbs copper
95% Recovery yields		2,280 lbs copper
Sales value of 2,280 lbs copper (50¢/lb)		$1,140.00
Expenses:		
Crushed ore (feed)	$250.00	
Chemicals	220.00	
Labor	96.00	
Power & Fuel	20.00	
Maintenance	5.00	
Overhead Expenses	50.00	
Approximate Production Cost	$641.00	641.00
Approximate Gross Profit per day		$ 499.00

May 21, 1971
Gerhard G. Luell

Proforma Statement of Production Cost

Production cost of 2,280 lbs. copper, approx.	$ 641.00
Production cost of 1 lb. copper, approx.	.28

Production cost of 454 grams copper, approx. 28¢

One liter pregnant liquor supposed to contain 20 gr. copper	1.3¢

One liter is 0.264 gallon solution

0.264 gallon solution contains 20 gr. copper	1.3¢
1.0 gallon solution contains 75.75 gr. copper	5.0¢

The production cost of one gallon solution containing 20 grams copper per liter	5.0¢

May 21, 1971
Gerhard G. Luell

DR. WILLARD PYE REPORT

WILLARD D. PYE
Consulting Geologist
3418 North Forgeus Avenue
Tucson, Arizona 85716

Telephone 327-2956

Arizona Mineral Resources
Box 5854
Tucson, Arizona 85703

Introduction

As per your request, I have made an appraisal of the feasibility of the programmed mineral extraction laboratory and precious metal processing plant, located in the Tombstone, Cochise County, Arizona area.

Your program using hydrometallurgical and various other extractive techniques, including the Simpson Process, is in keeping with the trend of modern technology.

Based on the data submitted, together with the writer's knowledge of the mineral occurence, marketing conditions and processing techniques, the following are my findings:

Need For Such Facility

Until the late 1800's almost every precious metal mine had its own mill and chemical extraction plant. Depressed metal prices and increasing costs resulted in a gradual demise of these local plants. Mines that did not have their own mill and chemical plant, as well as mines producing shipable ore, shipped to custom mills and smelters, of which many mining districts had one or more. Custom mills and smelters have gradually vanished, until today there are only a few smelters in the Western States and these are controlled by the major companies, which have virtually eliminated custom handling of material from mines other than their own. Only one handles custom ore and that with reluctance.

Many mines which could operate profitably under the present price of metals are inoperable for the lack of mill, sales outlets and smelter facilities.

Gold and Silver and Precious Metal Extraction

It is believed that the proposed facility should not only service the "small miner" and his production, but also should be in a position to license any extraction process it may develop to any interested mining companies.

The facility is to be located in the center of numerous precious and non-ferrous metal mines and mining prospects. Therefore, the facility can handle a wide range of metals. In this connection, the metal by-products should be kept in mind. For example, the United States Bureau of Mines " Mineral Yearbook for 1971 " in the chapter entitled "The Mineral Industry of Arizona", pages 12 and 13, states:

"Gold production (Arizona) was 94,038 troy ounces of which all was a by-product of copper mining, except a few ounces recovered from the lead and zinc ores and from gold prospects" , and

"Silver production was 6,170,000 ounces, a decrease of 16 percent from 1970. The reduction reflects lower copper production of which almost all (99.8 percent) Arizona silver is a by-product .....the remaining 0.2 percent from lead and zinc concentrates, smelting ores and fluxing ores."

The role of the facility is reversed as here the precious metals are the prime product and the by-products are represented as the base metals and other noble metals.

Present Trends in the Metal Extractive Industry

Leaching of metals from the mineralized rock, followed by precipitation of them from the solution, either as a metal or as a simple compound from which the metal can then readily be won, is an ancient technique for the extraction of metals from their ores. Leaching methods have been largely neglected in modern times in favor of the milling-flotation-smelting process, which today dominates the metal extractive industry.

Although the flotation-smelting processing of ores has been brought to a high state of efficiency and low cost per unit of material processed, during recent years the large amount of atmospheric pollution caused by the smelters and the consumption of large amounts of scarce fuels by this thermal refining process caused the mining and metal extractive industry to seek other means of extraction of the metal from the mineralized host rock.

The leach or hydrometallurgical processing of ores is in the fore-front of the new trends because of its non-atmospheric pollution characteristics, minimal use of fuels and low capital cost of plant and the simplicity of operation. The thermal (smelter) step is becoming obsolescent and will be replaced by the industry as soon as an economically feasible substitute can be found.

Hydrometallurgy and the Simpson Process

Basically, the hydrometallurgical process is a chemical leach process whereby one or more metals are selectively extracted by chemical solution from their mineral compounds. The extracted metals thus concentrated in the solvent are then removed by chemical precipitation, electro-winning or other process as the pure metal, or in some cases as a compound, which is easily converted to metal. The metal may be in a pure enough form to be used directly or it may need further refining as in the case with most cement copper (copper precipitated from the solution by iron).

The writer does not know the specific details of the Simpson method, other than the broad hydrometallurgical principals into which it falls, since much of this information is of a proprietory nature. The writer's knowledge of the process is based solely upon conversations with Mr. Simpson and a review of various results secured by him in which he used his process.

This process is purported to have the following specific advantages and/or improvements in extraction processes by his method:

1. Since chemical processing is in a closed system, pollution of air, water and land surface is essentially nil.

2. Fuel consumption is practically nil since electric power is available.

3. Installation and operation of the plant is relatively simple and economical and does not require a large capital outlay.

4. Processing is rapid with tests reported as extracting 80 percent of copper in an ore in 15 minutes after exposure to the extracting solutions.

5. The process works equally well on a variety of ores and metals such as oxides, sulfides, silicates and complex combinations.

6. The chemicals are in-expensive and common and are not highly poisonous.

7. The solutions are re-cyclable.

It is understood that the Simpson Process, as applied to copper extraction, is essentially perfected and ready for use, subject to testing individual ores for amenability to the process. It is further understood that the precious metal extraction process is essentially completed, subject to the economics of refinement.

Summary

In summary, the proposed ore processing and extraction plant located in the Tombstone area would be advantageous since:

1. It would be located in an area of precious metals mines; Tombstone, itself, being a famous silver mining camp.

2. It would serve as a custom milling and extraction plant to which small mines throughout the southwestern portion of the United States could ship their ore since today there is essentially no other area to process his ores.

3. The plant can serve as a source of gold and silver for individuals throughout the United States who wish to acquire gold and silver directly without going through brokers and the metal market.

4. The plant would be able to use the most feasible methods for concentrating and extracting metals from the ore whether it be hydrometallurgy or otherwise.

5. It will utilize methods which demand a minimum of fuel and produce a minimum of pollution.

6. The plant, which is located southwest of Tombstone, is in an area of minimum population, therefore there will be no complications with urban development or other related problems.

Willard D. Pye

WILLARD D. PYE
Consulting Engineer
Arizona Board of Technical Registration
4033

TEST RESULTS

PRECIOUS METAL RECOVERY TESTS

A sample of a complex, manganese bearing ore was assayed by standard fire methods before treatment by the Simpson method and again after treatment. The difference between the two assays indicates the effectiveness of the method on this type of ore. It is reported by Simpson that the minerals involved were a mixture of oxides and sulfides.

		Before Treatment		Residue After Treatment		Recovery (by difference) Using Simpson Method	
		Ore Rock*	Manganese Ore Rock**	Ore Rock*	Manganese Ore Rock**	Ore Rock*	Manganese Ore Rock**
Gold	oz/ton	o.02	0.04	Tr.	Nil	o.02	0.04
Silver	oz/ton	11.5	2.60	Tr.	Nil	11.5	2.60
Copper	%	3.60	0.10	0.01	0.04	3.59	0.06
Lead	%	5.00	ND	ND	ND	5±	ND
Zinc	%	10.8	ND	ND	ND	10±	ND
Manganese	%	ND	18.9	0.93	1.30	ND	18

Note:

* on the Assay sheet dated 5/4/73, it is understood that the sample labeled "Manganese Tails" is actually raw, Manganese-rich ore sample and not a "tail".

** on the Assay sheet dated 6/1/73, "Tail # 1" is an assay of the residue after treatment by the Simpson Method of the "Head Lot - 1" of the 5/4/73 assay sheet, and "Tail # 2" is a similar assay of the "Manganese Tails" of the 5/4/73 assay sheet.

Recovery Factor

Gold	= 99%	Zinc	= 99%
Silver	= 99%	Manganes	= 97%
Copper	= 99%	Lead	= 99%

Nevada Complex Sulfide Ore

On the assay sheets, the "Raw Ore" is a fire assay of the ore sample collected from the prospect; the "Tails # 1" is a fire assay of the residue after treatment by the Simpson method, but before washing of the tails (residue); "Tails # 2 is a similar assay after the tails were washed with water to recover all soluble material which might be left in them. Information is that the minerals occur as sulfides.

		Raw Ore	Residue After Treatment by Simpson Process and Washing	Recovery (by Difference)using Simpson Process
Gold	oz/ton	0.01	Tr.	0.01-
Silver	oz/ton	0.45	0.10	0.35
Copper	%	15.5	0.90	14.6
Zinc	%	1.80	1.05	.75

Recovery Factor

Gold = 99%

Silver = 77%

Copper = 94%

Zinc = 41%

LIST OF GOLD BUYERS

ARIZONA DEPARTMENT OF MINERAL RESOURCES
MINERAL BUILDING, FAIRGROUNDS
PHOENIX, ARIZONA 85007

February 1973

Possible Buyers of Gold

The following companies have informed this department that they are buyers of gold bullion, gold sponge produced by cyanidation or amalgamation, placer gold and milled gold.

American Chemical & Refining Company Inc.
Sheffield Street
Waterbury, Connecticut 06714
Telephone: (203) 757-9231
Contact: George Dietz, Jr., President

American Smelting and Refining Company
Southwestern Ore Purchasing Department
P. O. Box 5747
1150 North 7th Avenue
Tucson, Arizona 85703
Telephone: (602) 792-3010
Contact: A. J. Kroha

Associated Metals & Minerals Corporation
11944 Mayfield Avenue
Los Angeles, California 90049
Telephone: (213) 826-7372
Contact: J. A. Mandel

Engelhard Minerals & Chemicals Corporation
430 Mountain Avenue
Murray Hill, New Jersey 07974
Telephone: (201) 464-7000
Contact: D. L. Alexandre, Vice President

Homestake Mining Company
650 California Street
San Francisco, California 94108
Telephone: (415) 981-8150
Contact: Russell E. Wallace, Mgr. of Marketing
Note: Homestake does not buy gold amalgams

PGP Industries, Inc.
13429 Alondra Boulevard
Santa Fe Springs, California 90670
Telephone: (213) 921-7464
Contact: Sebastian P. Musco, President

Sabin Metal Corporation
316-334 Meserole Street
Brooklyn, New York 11206
Telephone: (212) EV1-5000
Contact: Andrew Sabin
Note: The Sabin Metal Corporation has also indicated that they buy gold in the form of electrolytic scrap, gold sweepings and plating solutions.

Western Alloy Refining Company
366 East 58th Street
Los Angeles, California 90011
Telephone: (213) 232-2281
Contact: A. Benjamins, President

Wildberg Bros. Smelting and Refining Company
349 Oyster Point Boulevard
South San Francisco, California 94080
Telephone: (415) 588-1120
Contact: Walter H. Duewel, Treasurer
Note: Wildberg Bros has indicated that they cannot handle milled gold that runs less than 300 ounces per ton.

Although the following two companies do not presently buy gold in the forms listed above, they are included due to their special interest in gold bearing materials.

Golden Cycle Gold Corporation
P. O. Box 5
Victor, Colorado 80860
Note: Golden Cycle is in the process of evaluating the possible reopening of their gold processing plant in Cripple Creek, Colorado district. When they reopen this facility, they have indicated that they would quite probably be potential buyers of gold in the forms listed above.

Inspiration Consolidated Copper Company
Inspiration, Arizona 85537
Telephone: (602) 473-2411
Note: Inspiration has indicated that although they do not buy gold in any of the forms listed, they do purchase siliceous ores for their smelter operation if the silica content is 70% or higher. When the ore meets the silica requirements and contains gold, silver or copper, they will pay for the added values in the ore.

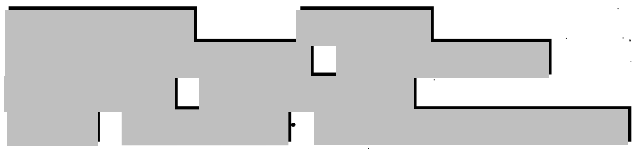
Individuals or companies desiring to sell gold material to any of the above mentioned firms should always contact the possible buyer prior to shipping the material or samples, as each firm has their own particular methods of handling purchases. Some of these companies may not always desire to purchase gold in all of the forms listed at any particular time and these companies also reserve the right to specify quantities and grade or purity of materials they purchase.

Many of the addresses shown for the listed possible buyers are business office addresses and, therefore, should not be used as receiving point locations for calculating shipping charges unless the possible buyer has been contacted and has confirmed a receiving point location..

For additional information on gold mining, prospecting and U.S. Government Gold Regulations contact the Arizona Department of Mineral Resources, Mineral Building, Fairgrounds, Phoenix, Arizona, 85007. Telephone: (602) 258-6681.

RESUME'S

CHARLES H. SIMPSON
2321 E. Highland Avenue
Phoenix, Arizona 85016
(602) 263-8674



EDUCATION

Benton Heights High School, Monroe, N.C.
Oregon State College - two years
Multhnomah College - graduated Business Administration (1952)
University of Oregon - Post Graduate work Chemistry & Geology (1952-1954)
Carnegie Institute, Pittsburgh, Pa. - Research in Sulfur Recovery Mineral Extraction-Geology (1957-1959)

MILITARY SERVICE

U.S. Marine Corps (1939-1945). Promoted to Acting Field 2nd Lieutenant; saw action in all three war theatres; served one year detached duty with British Expeditionary Forces; numerous beach landings in Pacific, starting with Guadacanal; wounded three times; Cited by Fleet Commander - also Presidential Citation (three times).

BUSINESS EXPERIENCE

Two years as Manager for Beneficial Standard Life Insurance Co., Portland, Oregon.

Three years in Credit and Collection Department of Weisfield's, Inc., Portland, Oregon - promoted to Manager.

Two years research on sulfur bearing properties and method to recover sulfur under auspices of Raw Materials Commission of Oregon (1959-1963). U.S. Government and United Nations Geological Survey Teams in Andes of Chile and Columbia.

Also, C.I.A. affiliations with Latin American Division (1959-1963) working in Chile, Columbia, Peru, Ecuador, Argentina and Bolivia.

1963-1965: Research on trace minerals evaluation on crops in San Joaquin Valley of California.

1965-1966: Check Detective and Special Investigator, Reno, Nevada.

1967-1968: Prepared 40-page Geological and Mineralogical brochure on ten square miles of Arizona property near Quartzite, Arizona for Southwest Silver Co.

1968 -to present: Engaged in independent consultant and research for various companies and individuals. Also investigates and evaluates mineral properties and processes; conducts confidential investigations for various agencies, including government.

CIVIL SERVICE QUALIFICATIONS

Research Analyst I & II
Revenue Agent I & II

PATENT OWNERSHIP

Patents granted on novel method of recovering sulfur from ore, U.S. 1962 No. 3-063-817 granted by U.S. Court of Appeals.

Patent issued on process of similar nature in Chile, Argentina, Peru, Bolivia, Columbia, Ecuador, New Zealand and Spain.

Patents issued in Spain and Chile for recovery of rare earths and metals from sulfur bearing materials.

Patents pending on copper extraction process, utilizing novel unique method of autocatalytic acid regeneration and pollution free copper recovery from complex ores.

Recently developed and prepared patents for filing on advanced method of recovering noble metals in solvent states from ores.

Developed method of reclaiming titanium and other metals from spent acid solutions, now being considered for commercial use.

PROFESSIONAL MEMBERSHIP

Lifetime members of D.A.V., V.F.W.
First Marine Division Assn., Icelandic Veterans

REFERENCES

Wesley Bolin - Secretary of State, State Capital Bldg., Phoenix, Az.
Phillip Creighton - U.S. Department of Commerce, San Francisco, Cal.
Irving M. Abrahams, PHd. - Manager, Technical Research & Development Diamond Shamrock Chemical Co., Redwood City, Cal.

TECHNICAL PAPERS

Prepared for United Nations, Santiago, Chile Division - complete brochure on minerals in Huasco and Villenar Province of Chile, including photos and maps.

Presented Honorary Chilean Star by Governor of Huasco Province, for service to people of Region toward development of Industry.

Received letters of commendation from Chilean Government for work with sulfur development projects.

Recently granted special visa by Mexican Government to encourage investment in Mexican Mineral Industry.

Fluent in reading and speaking Spanish - also reading French.

DATA SHEET

R. W. Henderson
3311 W. Camelback Rd.
Phoenix, Arizona 85017
Telephone: 602-973-5980

Personal Data, February 1974

Age 28 — Health excellent
Height 6 ft, 0 in — Single
Weight 185 lb — Draft Status: IV-A

Education

West High School, Phoenix, Arizona, 1963
Phoenix College, Phoenix, Arizona, 1966, Degree: A.A.
University of Arizona, Tucson, Arizona, December 1973,
Degree: B. S. in Geological Engineering
Important Courses (Semester hours shown)

Mathematics (22)	Geosciences (28)
Engineering (23)	Geophysics (9)
Physics (23)	Chemistry (17)
Technical Writing (2)	Economics (6)

Percentage of expenses earned: 95 %

Experience

July 1970 - May 1971 (Part time)
"Engineering Assistant" under Mr. Charles Freesh,
Tombstone Mineral Reserves, Inc., Phoenix, Az.

September 1966 - June 1970
Duty with The United States Army Security Agency
" Top Secret Security Clearance "

February 1966 - August 1966
Assistant for property acquisition and reservoir
analysis with Apache Drilling Co., Phoenix, Az.

Summers 1964 and 1965
"Roughneck" on gas and water drilling rig for
Apache Drilling Co., Phoenix, Az.

References

Will be furnished upon request.