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

03/20/90

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: EMERALD ISLE

ALTERNATE NAMES:

MOHAVE COUNTY MILS NUMBER: 127A

LOCATION: TOWNSHIP 23 N RANGE 18 W SECTION 22 QUARTER S2
LATITUDE: N 35DEG 21MIN 49SEC LONGITUDE: W 114DEG 11MIN 29SEC
TOPO MAP NAME: CERBAT - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
COPPER

BIBLIOGRAPHY:

ADMMR MOHAVE CUSTOM MILL PROJECT
ADMMR EMERALD ISLE FILE & COLVO FILE
DINGS, M. "WALLAPAI MNG DIST, CRBT MTNS, AZ" USGS BULL 978-E, P. 149-153, 1951
WEED'S MINES HANDBOOK, VOL. XIII, P. 367
AZ STATE MINE INSP, ANL RPT, 1973, P 13
THOMAS, B.E. "GEOL. OF CHLORIDE QUAD", P 411 418, 419, 1953 (ADMMR GEOLOGY FILE)
THOMAS, B., ECON. GEOLOGY, VOL. 44, NO. 8, P. 700-703
MALACH, R.,"MOHAVE COUNTY MINES" 1977, P. 55
USBM PROD TABS - OWN/OP: EL PAST NATURAL GAS
USBM INFO, 1973 PROD: 2030407 LBS CU
D'ANDREA, D.V. ET AL "IN SITU LEACH RESEARCH IN COPPER DPSTS AT EMERALD ISLE MINE " USBM RI 8236, 1977
AZ. MINING ASSOC. "COMM. ON BLM UPPER SONORAN DRAFT WILDERNESS DRAFT STATEMT" (ADMMR GEO)

A

EMERALD ISLE MINE

MOHAVE COUNTY
T23N R18W Sec 22

MILS # 127A

USGS Bull. 978-E, p. 145

ABM Bull. 180, p. 136

Economic Geology, Vol. 45, p. 175, 176
" " Vol. 46, p. 231-233, Searls, F. Jr., 1950

Arizona Mining Journal, February, 1920, p. 36
" " " May, 1920, p. 29
" " " December, 1918, p. 21
" " " May, 1919, p. 24

Geo. Report - Az. Mining Assoc. "Comments on the BLM Upper Sonoran EIS"

Mines Handbook, Vol. XIII, p. 367

Malach, Roman,-Mohave County Mines, p55

Thomas, R.E. Geology of the Chloride Quad

Metal Mining & Processing, February, 1965, p. 38

E/MJ, Vol. 167, October, 1966, p. 139
" February, 1967, p. 202
" Vol. 168, June, 1967, p. 246

Skillings Mining Review, May 27, 1967, p. 25
" " " December 28, 1974, p. 5 (in situ leaching study by El Paso Mining & Milling Co.)

World Mining, May, 1967, p. 41

Thomas, B. E., Geology of the Chloride Quad 1953, p. 411, 418, 419
Geology File

Mohave Custom Mill Project Card file

Mines Handbook, Vol. XIII, p. 367
Malach, R., Mohave County Mines, 1977, p. 55.

MILS Sheet sequence number 0040150474

USBM RI 8236 IN-SITU LEACHING [illegible] AT EMERALD ISLE

Arizona Department of Mines and Mineral Resources

INFORMATION FROM MINE CARDS IN MUSEUM

ARIZONA

MM-K079 Chrysocolla

Mohave Co.
Wallapai Dist.
Emerald Isle Mine

mils # 127A
0-AKA:
Emerald Isle (file)

development and construction of the Briggs mine in California.

In July 1996, the company reduced $21.1 million of debt through redemption of its convertible notes by issuing 6,346,000 shares of common stock.

is in the permitting and development stage at the 8.2 million ounce McDonald gold project in Montana.

The company's address is 14142 Denver West Parkway, Suite 250, Golden, CO 80401, (303) 278-8464.

Placer Making Changes At Golden Sunlight Mine

VANCOUVER — Placer Dome Inc. advised that significant organizational and operational changes are being implemented at the Golden Sunlight mine to improve its performance. The corporation regrets that as a result of the reorganization, a reduction in the workforce of 73 employees was announced. While 10 to 15 of these employees will be transferred to other operations in the Placer Dome Group, the balance will be provided with severance packages.

In 1993, the mine, located at Whitehall, Montana, completed a profitable year with record production of 121,600 ounces of gold. In June 1994, however, ground movement under the plant facilities necessitated the shutdown of the mine and mill. Operations resumed in February 1995. In 1996, taking the changes into account, production is expected to be about 118,000 ounces with 203 employees at year-end, compared with 89,700 ounces with 301 employees in 1995.

The company's address is 1600 -1055 Dunsmuir Street, Vancouver, BC Canada V7X 1P1, (604) 682-7082.

ZAIRE

Copper-Cobalt Project

MONTREAL — Melkior Resources announced that a preliminary agreement has been negotiated between Trillion Resources Ltd. and La Generale des Carrieres et des Mines of Zaire for the exploration, development and exploitation of mineral deposits in an area covering 2,806,82 square kilometres in the centre-east portion of the Shaba Copper Arc in Zaire.

The arrangement has been designed to focus on defined copper and cobalt deposits in its first stages, but will allow the parties flexibility in subsequent cooperative activities.

In accordance with its agreement with Trillion, Melkior will be financing approximately 1.5 M$ of exploration activities in the region. The program will be undertaken subsequent to the execution of the preliminary agreement.

its operations, he added.

Ian Bayer, Battle Mountain President and Crown Butte Resources Chairman, said, "The protracted permitting process and potential liabilities related to historic mining adversely impacts project economics, which necessitated a reevaluation of the project. The agreed upon value of the property exchange is in keeping with the net present value attributed to the Crown Butte asset in the recently completed merger."

News

Copper Recoveries Improve At Yerington And Johnson

TUCSON — Arimetco International, Inc. reported a net profit of US $373,864 for the quarter ended June 30, 1996. This compares to a net profit of US $2,180,408 for the same period of 1995.

Copper production increased from 5,663,459 pounds for the period in 1995 to 6,628,032 pounds while sales decreased from $7,894,398 to $7,774,751 due to decreasing copper prices. The operation of crushing plants at both Yerington and Johnson contributed to the increase in production while their operating cost negatively impacted the net profit during the start-up period.

The company has taken action to lower its corporate overheads by reducing staffing, deferred the Emerald Isle start-up and has slowed its permitting expenditures on Zonia as a precaution to further price weakening. All permitting activity is currently focused on Sullivan and Paradise Peak.

Arimetco President H.R. Shipes said that cyanidation of existing ore on heaps began late in the second quarter at Paradise Peak with gold sales projected to commence in late August. Permitting activities of Sullivan are progressing well. The company is preparing major modification requests to the Paradise Peak permits that will allow incorporating Sullivan as a satellite orebody of Paradise Peak. Permitting activities are going smoothly and we remain optimistic that the required permits will be forthcoming with a minimum of delay.

The start-up of crushing plants at both Yerington and Johnson was completed during the quarter. The equipment fabrication was not well done by the supplier and a considerable amount of rebuild was required to achieve design throughput on a regular basis. This rebuild was accomplished with a minimum of down time and the plants are performing reasonably well. Copper recoveries have been significantly improved with crushing.

The company's address is 335 North Wilmot Road, Suite 400, Tucson, AZ 85711, (520) 748-2600.

Dated Material — RUSH

Johnson Mine
Emerald Isle
Zonia
(Codise Cf.)

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1989

BARIMETCO INC.

8835 E. Speedway Blvd. #A, Tucson, 85710, Phone - 290-9200

President .....H. Roy Shipes
Vice President ..... John Bracale

Emerald Isle T23N R18N Sec. 22
In - situ copper leach - precipitate production - Employees 3.

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1990

ARIMETCO INTERNATIONAL INC.

8835 E. Speedway Blvd. #A, Tucson, AZ 85710, Phone 290-9200
President .....H. Roy Shipes
Vice President ..... John Bracalek
Emerald Isle T23N R18E Sec. 22
Employees: 3 - In - situ copper leach - precipitate production - On standby.

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1991 Mohave County

ARIMETCO INTERNATIONAL INC.

8835 E. Speedway Blvd. #A, Tucson, AZ 85710, Phone 290-9200
President .....H. Roy Shipes
Vice President ..... John Bracale
Emerald Isle T23N R18E Sec. 22
Employees: 3 - In - situ copper leach - precipitate production - On standby.

rther information.
com

the six months ended ... operating margin at Klipdam was $484,000, with diamo[illegible]les gener-

T) and **Ocean Resources** (OCR-V) have decided to try again.

September 15, 1997 - Northern Miner, page 6

of 2 metres.

Trans Hex has agreed to fund the second bulk sample to completion, up to a maximum of US$1 million. In return, Ocean will transfer an additional 12% project equity to Trans Hex, allowing the latter firm to reach 51% ownership.

TNK recovers macros at Gope

Results from 21 of 25 samples from the Gope project in Botswana show three macrodiamonds (larger than 1 mm) and 50 smaller stones from 1,330 kg of kimberlitic material.

Project owner and operator **TNK Resources** (TNKR-C) reports that all the macros and most of the small diamonds came from the Bay kimberlite pipe, whereas the Wall and Diagonal pipes yielded the rest. Results from the King kimberlite body are incomplete.

WHITECLIFFS (P) PIM
JOHNSON (F) COCHISE, ZONIA (P) YAVA
EMERALD ISLE (H) MOHAVE

Pickin' Down 144

Emerald Isle Copper Mine Is Reopened

By BEN AVERY

What promises to be a stable operation is being started at the Emerald Isle copper mine two miles from Chloride by Lew and Mathias Company of St. Louis, one of the nation's largest copper tubing fabricators.

The company took over the Emerald Isle after looking over much of the west for a good leaching proposition to supply metal for its fabricating enterprises, and plans to use an acid leaching process in the operations.

Since taking over the property, Lew and Mathias has done considerable diamond drilling, exploring the ore body. The Emerald Isle ore is a conglomerate impregnated by leaching and its operation in the past has been handicapped by inadequate financing.

* * *

WHILE on the subject of copper, several small properties throughout the state which have been closed since copper prices dropped in 1930, or thereabouts, are being reopened to make high grade shipments.

One of these which may join the ranks of producers is the old Black Reef located in Cunningham Pass, nine miles north of Wenden. The Black Reef and adjoining claims were purchased recently at tax sale by William Harris of Yuma, who owns the nearby Centroid copper mine.

Its story is typical of many small Arizona mines today. The property was located in 1915 by C. W. McKee and E. C. Diefendorf and patented in 1924. Through the years 1,280 feet of development work was done, including a 480-foot shaft.

Then came the war. The area became a bombing range and the owners could not work their property. However, during these war years there was no way to keep youths and passers-by from rolling rocks down the shaft, entering buildings, taking what they wanted and breaking up what they wanted to break.

Recently, after an examination by C. H. Dunning of the Arizona Department of Mineral Resources, Harris began retimbering the collar of the shaft, which had caved.

Just below the collar he found the vein exposure on which the shaft was sunk and took some samples. They ran up to $100 a ton copper and gold. So he is going to put in a few more sets and try to get the old workings open.

* * *

FROM ALAN SHARP of the U. S. Bureau of Mines comes a comprehensive report on the Klondyke district. Having got my first pair of Levis at Greenwood's store and also my first plug of Brown's Mule at the same emporium, Klondyke still seems like home.

Sharp reports the new 100-ton mill of the Athletic Mining Company will commence operations there this week. All of the equipment is new except the ball mill. The company will use selective flotation with two sets of Denver cells to concentrate the lead-zinc ore. Lead concentrates will be shipped to the American Smelting and Refining at El Paso and the zinc will go to the Athletic Mining and Smelting Company's retort furnaces at Fort Smith, Ark.

The mill will not take custom ore, treating ore from the Aravaipi group only.

* * *

A 50-foot winze is being extended in the Iron Cap, four miles north of Aravaipi, and lead-silver ore is being shipped from the Head Center mine, three miles northwest. Extraction at the Head Center is through a 350-foot incline shaft, which must be pumped. It is the only wet shaft in the district.

Raymond F. Orr of Fort Smith is president and chief engineer; Harvey L. Horton of Safford is vice-president and manager, and Anthony Bennett of Klondyke is mine foreman. About 30 men are employed and the crew is expected to be enlarged when the mill is running.

* * *

MACHINERY and equipment has been installed at the Silver Coin mine four miles east of Klondyke and R. F. Urbana and Knute G. Anderson, manager and superintendent, respectively, are employing about 10 men in reopening the old property.

The mine, carrying values in copper, lead and silver, is opened by a tunnel and several shafts.

* * *

ALBERT SPALDING of Safford plans to explore several outcroppings of copper bearing material at the Lone Star group of claims 10 miles north of Safford, and has moved a portable compressor mounted on a tractor to the property.

The principal vein is 30 inches wide and occurs in a quartz monzonite porphyry.

* * *

SOME GOOD showings of lead-silver ore have been uncovered by Raymond Pointer while drifting off a winze in the Sein Fein mine 2½ miles northwest of Aravaipi. Pointer and G. C. Harwood, Phoenix, and E. H. Lundquist, Phoenix mining engineer, are leasing the property. Lon Rutledge of Aravaipi owns the eight patented claims.

* * *

cont.

CARROLL WEED, general superintendent of Inspiration Consolidated Copper Company, was elected chairman of the mining division of the Arizona section of the American Institute of Mining and Metallurgical Engineers at its fall meeting November 12 in Superior, succeeding Wesley P. Goss, general manager of Magma, who presided at the meeting.

More than 70 mine officials from all parts of the state attended the meeting as guests of Magma and toured the mine workings, then heard papers by John L. Draeger, assistant engineer, on drift timbering, and by B. Van Voorhis, chief field engineer, on stoping methods at Magma. The subject of the meeting was devoted to the support of heavy ground.

The group voted to hold the next meeting at a mine using the block caving method, either the Ray mine at Kennecott or Inspiration.

* * *

THE ANNUAL meeting of the Arizona section of AIMME will not be held this year as members have agreed splitting the section into technical divisions is more satisfactory.

After the session the members enjoyed tacos, tamales, burros, cerveza, tortillas, frijoles and salsa picante as guests of Magma.

* * *

HERNAN COUSINO, assistant chief of labor inspection, Santiago, Chile, is traveling through western mining camps to become familiar with American health and safety practices in the mines. He flew to Phoenix Friday to spend a week with the United States Bureau of Mines engineers.

A. D. Look, engineer in charge of the Phoenix safety branch, will conduct Sr. Cousino to as many of the large mining operations in Arizona as time will permit so he can observe the safety equipment, organization, rules and measures pertaining to safety.

* * *

HERE ARE some of the mines active earlier in the year and now idle: Binghampton, operated by George L. Hanson, Mayer; Caveness, J. A. Whitney, Cavecreek. Gold Coin, Carl and John Shoemaker, Prescott; Roosevelt, W. W. Bison, Prescott; Victor Copper, Charles Brown and C. W. Fryor, Prescott; Arizona Klondyke, Robert Hyde, Dos Cabezos; Bonanza, Byrd Brothers, Washington Camp; Braathen, A. Braathen, Amado; Bulldozer, Sherwood Owens, Helvetia; Bulldozer Sublease, R. E. Chilson, Helvetia; Devonian, L. H. Dykes, Bowie; Doran Prospect, Kennedy, Doz Cabezos; Duquesne, Byrd Mining Company, Washington Camp; Elgin, D. G. Chilson, Helvetia; Fortuna, C. R. Breedon, Arivaca; Gladstone, W. W. Todd, Nogales; Gold Pen, T. C. Kinsey, Mammoth; Holland, Byrd Brothers, Washington Camp; Intervenor, A. P. Giacoma, Tombstone; Kansas-Maine-New York, Byrd Brothers, Washington Camp; Keystone, Norman Rhea, Dragoon; LaFortuna, W. E. Holt, Tombstone, and Landsman Group, C. L. Burney, Klondyke.

Crushing Plant On Site At The Yerington/MacArthur Mine

TUCSON, AZ — Arimetco International Inc. reported a net profit of US $2,182,908 for the third quarter ended September 30, 1995, compared to a net profit of US $494,495 for the same period of 1994.

The crushing plant to process MacArthur ore has been received on site at the Yerington/MacArthur mine in Lyon County, Nevada, and installation is ongoing with completion scheduled in November. A new 1.5 million square foot pad has been constructed to receive only crushed, acid cured MacArthur ore.

Additionally, mining and leaching will continue at the Yerington slot, so that no loss of production is anticipated during the changeover. The SX-EW plants currently have a capacity of 65,000 ppd which will be quickly realized when MacArthur ore becomes the project's primary feed source.

At the Johnson Camp mine, located 65 miles east of Tucson, Arizona, installation of a two-stage crushing and screening plant is complete. 800,000 square feet of new reusable pad area has been developed to take only crushed, acid cured ore. Arimeto President H.R. Snipes said that this will allow greater monitoring and control of the leach cycle which should recover 70% of contained copper in 60 days. Expansion of the electrowinning plant to 40,000 ppd by the addition of twelve cells is scheduled for completion in mid-November when production exceeds the current 28,000 ppd plant capacity.

The Emerald Isle mine near Kingman, Arizona, is being readied for start-up. A small crushing plant is being installed and the SX-EW plant is being expanded to 10,000 ppd. Mobile mining equipment will be leased and the company anticipates a December re-start of operations.

The company has entered agreements to purchase the Sullivan orebody and 100% of FMC Paradise Peak Corporation. FMC Paradise Peak Corporation's major asset is the Paradise Peak mine, located 2.2 miles from the Sullivan orebody near Gabbs, Nevada. It includes the Paradise Peak gold processing plant, facilities and infrastructure, which originally cost US $65 million to construct in 1986. It also has the majority of permits required for operations, still in good standing.

These will remain in effect with the change of ownership of the company and Arimetco will immediately file modification requests to treat Sullivan as a satellite orebody of Paradise Peak and reopen the Sullivan adit for sample collection. The purchase also includes 592 acres of patented lode millsite claims and 2,900 acres of unpatented lode claims.

Under the terms of the purchase agreement, Arimetco will pay the sum of US $4.0 million to FMC Gold and post an additional $1 million reclamation bond. All current reclamation liabilities (estimated at $5.5 million) will remain with FMC Paradise Peak Corporation and become Arimetco's responsibility. FMC Gold will retain a 2% net smelter royalty on any gold produced only from the Paradise Peak property.

Initial feasibility studies plan a mining rate of 3,600,000 tons of ore per year to be processed at Paradise Peak to produce 22 million pounds of copper and 75,000 ounces of gold per annum during the initial five years, with copper recovery continuing at least another 3 years. Processing will be a sequential leaching with copper removed first by strong acid curing and leaching. Ore will then be washed, screened, pH adjusted and cyanide leached. Metallurgical testing has confirmed commercial recoveries of both copper and gold with acceptable consumption levels of acid, lime and cyanide.

The Sullivan orebody hosts 17 million tons of ore grading .0255 ounces of gold per ton and 0.34% copper and 8.5 million tons of copper ore grading 0.31% copper at an overall strip ratio of 1:1.

Arimetco has commissioned Western States Engineering to produce a full feasibility study which will include further metallurgical testing and design of the SX-EW plants to be constructed at Paradise Peak. Westec has been assigned the responsibility of preparing permit modification requests. The company anticipates that both will be completed prior to the end of the first quarter of 1996.

The Arizona Department of Environmental Quality has again requested additional work for completion of the Technical Review phase of permitting for the Zonia property in Yavapai County, Arizona. This work is underway and will be completed shortly. Due to the delay in permitting, the company is considering packaging Sullivan/Paradise Peak and Zonia into one financing. Zonia is designed to produce 22 million pounds of copper annually, when fully operational.

The company's address is 335 North Wilmot Road, Suite 400, Tucson, AZ 85711, (520) 748-2600.

Emerald Isle (f)

ZONIA - YAVAPAI C. VAN DYKE, GILA, EMERALD ISLE, MOHAVE

Arimetco may bring Zonia SX-EW operation on line this year

By Bill Epler
Staff Reporter

Arizona is expected to soon have another nine-for-leach, SX-EW copper producer.

Arimetco International Inc., a Tucson-based firm with several such operations, is anticipating receiving final operating permits some time this fall for its Zonia property miles east of Kirkland Junction in Yavapai County.

If the permits come through as expected, production could start in the fourth quarter, according to Harrison Matson, chief geologist and in charge of the project.

Production will be reached quickly because of preliminary work already completed by Arimetco and by a previous operator, McAlester Fuel Company. The Oklahoma firm developed and operated the mine, producing cement copper, from 1966 until 1974, when it was forced to close due to low copper prices. Old timers will recall that to break up the orebody, McAlester set of a blast of some 4 million pounds of explosives, creating what was rated at the time as the largest man-made detonation ever.

Interestingly, several years ago a firm proposed utilizing the openpit mine for a large landfill, an idea not very well received by area residents and various agencies. When the Arizona Department of Environmental Quality denied operating permits, the property was leased by Arimetco in December 1993.

Arimetco holds a 100 percent leasehold interest in the Zonia, with an option exercisable this year to purchase the property free and clear of any royalties.

Also helping to bring the property into production in a short time, Arimetco has already developed a pond system, with DEQ's blessing, to resolve a water remediation problem left over from the previous operation.

Matson told *PAY DIRT* in mid-June Arimetco expected to receive an "Intent to Issue Permit" notice, including the draft environmental acquifer protection plan, by the end of June, which will clear the way for additional preparatory work. This will be followed by a public comment period.

Project design and a feasibility study has been completed by Western States Engineering for an openpit mine and a 60,000 ppd SX-EW plant. Civil construction of all required PLS and raffinate ponds and water discharge containment ponds has been completed.

The onsite pumpback well system is performing as anticipated, Arimetco said in its 1994 annual report, and a zero discharge status has been maintained for more than 2 years. Access roads have been widened to accommodate heavy equipment to be used during construction.

The Zonia mine is a precambrian porphyry copper deposit containing disseminated oxide mineralization. A pre-mine planning drill program was completed in March 1993. Ore reserves estimates prepared by Mines Reserves Associates Inc. indicate 47 million tons grading 0.33 percent copper. These reserves are fully diluted and mineable with an economic cut-off grade of 0.14 percent copper and a stripping ratio of 0.47:1.

Matson said Arimetco expects further exploration will increase ore reserves on strike to the north.

Column testing of the various ore types has been conducted and, at year-end, was ongoing to determine expected recoveries. Leach testing, it said, indicates that crushing will increase total recovery and significantly shorten the leach cycle time.

According to the 1994 annual report, Zonia is designed to produce 22 million ppy year of cathode copper at a cash cost of 54 cents pp. Capital costs were estimated at $17.5 million.

Arimetco recently announced a private stock placement that secured financing for this and other company projects.

Other Arizona projects

Also included in Arimetco's inventory of properties, expected to be developed in the relatively near future, are the Van Dyke mine in the Globe-Miami area and the Emerald Isle mine near Kingman.

Arimetco holds a 100 percent leasehold interest in the Van Dyke, an historic property where Occidental Minerals did extensive work a few years ago before calling it quits after a long fight with the Miami Town Council, which said it feared subsidence from the mine under the town. Kocide Chemicals subsequently developed the underground property as an in situ operation, but the recovery system used was uneconomic and Kocide pulled out. Now, with SX-EW, Arimetco believes it will be profitable.

In its 1994 annual report, Arimetco said it plans to use underground stoping of part of the orebody, allowing rubblization to spread to the remainder. Underground sumps will be built and the ore leached within the stope itself, from injection well drifts immediately above. Pregnant leach solutions will be pumped to an SX-EW plant on the surface.

Arimetco said the ore reserve is 101 million tons averaging 0.60 percent copper, using a 0.30 percent cutoff. However, with stope leaching, it said, reserves may be significantly expanded as a lower cutoff is usable.

Matson said the permitting process with DEQ is in a holding pattern due to project priorities and a shortage of required technical people.

At Emerald Isle, work on bringing that property back into production is on the "back burner," said Matson, pending completion of projects with higher priorities and availability of funds.

Operations at the openpit copper mine and 8,000 ppd SX-EW plant were suspended in September 1993. It has since been on a care and maintenance basis.

Arimetco said a mining plan and financial model indicates the mine could be profitably operated at today's copper prices. It said a decision to reopen the property will be made upon completion of engineering for a crushing plant, a tailings pond and design of an expansion of the SX-EW plant to 10,000 ppd of cathode copper.

The Arimetco staff recently revised ore reserves upward to 2.6 million tons averging 0.51 percent copper using a 0.20 percent cutoff grade. The stripping ratio would be 2.2:1.

Mines and Miners

Arimetco to buy Nevada copper, gold orebody

Arimetco International Inc. said June 21st it had reached an agreement in principle to acquire the Sullivan orebody at Gabbs, Nevada. The agreement is subject to completion of final claim ownership due diligence.

Reserves are about 17 million tons of oxidized material grading 0.34 percent copper and 0.0255 opt gold. Sullivan also contains another 8.5 million tons of copper-only ore grading 0.31 percent.

The ore is amenable to heap leaching using sulphuric acid for copper and cyanide for gold on a sequential basis, Arimetco said.

Initial planning contemplates a mining rate of 85,000 tons of ore per week to produce 60,000 pounds of copper per day via solvent extraction-electrowinning for a period of 8 years and 70,000 ounces of gold a year for 5 years of the project life.

Arimetco said it estimates a minimum of 1 year will be required to obtain operating permits for the mine and anticipates an early filing as a result of design work already completed.

Arimetco sells stock for work at 4 mines

Arimetco International Inc. said June 1st it had completed the private placement of 5.5 million special warrants at $1.25 each for total proceeds of $6.9 million.

Proceeds will be used for:

— Leach pad expansions at the Yerington mine;

— Plant modification and equipment purchases at the Johnson mine;

— Advance purchase of long lead-time items for the Zonia mine; and

— Restart of Emerald Isle.

JOHNSON (F) COCHISE EMERALD ISLE (F) MOHAVE, ZONIA (F) YAVAPAI
VAN DYKE (F) GILA

Arimetco net perks up as copper operations are expanded

Arimetco International Inc. reported earnings improvements in the second quarter and half and that it is making progress with expansion of several copper operations.

The company had a net profit of $238,000 in the second quarter, compared with a net loss of $961,000 a year earlier. Sales of products were $4.8 million in the recent period, compared with $3.3 million a year earlier.

For the 6 months, net was $525,000, compared with a loss of $1.2 million in the first half of 1993. Sales were $7.6 million vs. $6.1 million.

Arimetco made 4.6 million pounds of copper in the second quarter and 8.9 million pounds in the half. That compares with 5.0 million pounds in the year-earlier quarter and 9.6 million pounds in the 1993 first half.

Lower production was a result of the temporary suspension of ore hauling at Johnson and the closure of Emerald Isle in response to lower copper prices in the last half of 1993.

At Johnson, in Cochise County in southeastern Arizona, ore hauling was restarted in the second quarter, with a second shift added in July. Daily production began to increase as soon as the first panel of new ore came under leach.

Permits were granted and a new pad constructed, loaded with ore and put under leach during the second quarter. Solutions are now contributing to production, the company said. Normal operating levels were to be reached by late August or early September.

The Emerald Isle project in Yavapai County, Arizona was being readied for restart, Arimetco said August 10th. The electrowinning plant is being expanded to 10,000 pounds per day of cathode.

The Yerington-MacArthur property in Nevada received whole site permits in late 1993. Pad expansion started immediately, with production beginning a corresponding increase, continuing during the first 2 quarters of 1994, Arimetco said.

New pad construction continues and will do so throughout the year. As more pad area is developed and loaded with ore, solution flows increase as does copper production.

The company has completed electrowinning capacity of 65,000 ppd. The solvent extraction plant is being increased to handle higher flows as more pad area comes under leach.

At the Zonia mine in Arizona, the company said, it has been notified by the state that permitting has reached the technical review stage and that permits will be forthcoming in 3-4 months. Engineering of a 50,000 ppd SX-EW plant has been completed by Western States Engineering of Tucson.

Civil construction of all required pregnant leach solution and raffinate ponds has been completed. Site civils will be completed prior to issue of permits.

Construction time is now estimated at 6 months from the issue of permits, Arimetco said. The plant will be constructed in 2 modules of 25,000 ppd each. The first module has been purchased, delivered and paid for with erection to commence immediately upon issue of permits.

At the Van Dyke property, near Miami, Arizona, rehabilitation of the access shaft was suspended when the adjoining Miami mine was flooded. Water levels are being controlled and work has resumed at the site. Permitting of an SX-EW plant is in progress with completion estimated in 6-8 months.

The company said permitting is advancing rapidly at Zonia and Van Dyke with a large part of development costs of both projects having already been paid.

Arimetco is still gathering data at the Mesaba copper-nickel project in Minnesota. Reserve estimates and initial mine planning were completed in the first half.

Reserves are estimated at 2.5 billion tons grading 0.45 percent copper and 0.12 percent nickel, with "significant" precious metal credits, the company said.

Lakefield Research completed metallurgical testing, demonstrating that commercially viable copper and nickel concentrates can be produced with good recoveries. The firm also developed a flow sheet.

A bulk sample will be collected in the second half and processed at the Coleraine Minerals Research Lab in Minnesota to produce concentrates for leach testing. Permits are in place for bulk sample mining and the company has solicited contractor bids.

Though times have been rough for Arimetco, the company said, costs have been slashed. "Management has been consolidated with a refocus on North American copper operations."

Mines and Miners

Mueller heads processing at Cyprus Sierrita mine

Steve Mueller, who has been general manager for Climax Molybdenum at Ft. Madison, Iowa, has been named manager of metallurgical processing at the Cyprus Sierrita property near Tucson.

He has been succeeded at Ft. Madison by Mohamed "Mo" H. Khan, a graduate in metallurgical engineering from the University of Arizona. Khan has served since 1975 in several management positions at Sierrita, first with Duval Corporation and then with Cyprus following the 1986 acquisition.

Washington Report . . .

has been targeted to bear a portion of the burden.

The Clinton administration has requested approximately $208 million for the LWCF in fiscal 1994, a reduction of about $100 million from 1993.

"Our request is inadequate," Babbitt said. "But is is driven by the context of austerity. There is simply no choice."

Unless Johnston can find a way to pay for his bill without increasing the federal deficit, Babbitt said, the administration will oppose his legislation.

First-quarter donations to enviro groups were up

An increase in contributions to environmental groups was reported in a recent issue of *The Chronicle of Philanthropy*, apparently caused by an upturn in the economy.

Notable increases in the first quarter, compared to the year-earlier period, were seen for the following:

— National Wildlife Federation, $19.9 million to $20.8 million.

— Natural Resources Defense Council, $3.9 million to $5.6 million.

— National Audubon Society, $3.5 million to $3.7 million.

— Wilderness Society, $3.8 million to $4 million.

An exception was Greenpeace, where contributions declined from $5.3 million to $3.1 million.

AMC argues "union free" term protected by law

In an *amicus brief* filed recently with the Tenth Circuit U.S. Court of Appeals in *Phelps Dodge Mining Company v. National Labor Relations Board*, the American Mining Congress argues that use of the term "union free" in company informational material is constitutionally protected free speech because it contains no threat or promise, but merely defines the status of an employee not affiliated with a union.

The case arose out of a dispute occasioned by Phelps Dodge's announcement in 1990 of a program of fixed-formula quarterly payments to nonunion employees. The term was used twice in company informational materials to describe employees who would receive the new payments.

The NLRB found that the term by itself had an "inherently unlawful tendency" to interfere with the right of employees to be represented by a union.

The AMC brief urges the court to set aside the NLRB decision because it "impermissibly infringes on an employer's right to communicate with its employees as guaranteed by the National Labor Relations Act and the First Amendment."

"That? Oh, that's our Indian guide!"

Committees are discussing wetlands issues proposals

In an attempt to resolve contentious wetlands issues, the Clinton administration in May convened an interagency group with the express purpose of having recommendations ready within 90 days.

In recent hearings on reauthorization of the Clean Water Act (CWA), House Public Works and Transportation Committee Chairman Norman Mineta (D-Calif) indicated that wetlands proposals will be included in the reauthorization bill his committee will report.

Senator Max Baucus (D-Mont), chairman of the Environment and Public Works Committee, indicated that CWA reauthorization would be a "top priority" for the committee and that wetlands also will be under consideration.

The Senate plans to hold CWA hearings in August, with markup in September and October.

CWA hearings were concluded in the House in mid-May.

High court agrees to hear UMW appeal of record fines

The Supreme Court agreed June 1st to consider lifting $52 million in contempt-of-court fines imposed on the United Mine Workers of America during a violent 1989 labor strike in Virginia, the Associated Press reported.

The fines are believed to be the largest ever imposed by a U.S. court for civil contempt. The union argues the fines are "so grossly excessive" they are unconstitutional.

Vucanovich wants to put brakes on Yucca Mountain

A bill introduced in late May by Representative Barbara Vucanovich (R-Nevada) would prohibit spending any money for nuclear waste storage activities at Yucca Mountain for 5 years.

The bill calls for the spending freeze for fiscal years 1994 through 1998, during which time the National Academy of Sciences would conduct a study to find a "suitable" (meaning anywhere but Nevada?) location for a high-level nuclear waste repository.

The bill also would move back the date for opening of such a repository from 2010 to 2015 and would extend from 1998 to 2003 the date for the government taking title to high-level waste from utilities.

Vucanovich said she introduced the bill, *The Nuclear Waste Policy Reassessment Act of 1993*, because "the Department of Energy hasn't been able to get its act together" in its study of the Yucca Mountain site.

"The ability of the Department of Energy to conduct an open-minded scientific determination that the site is suitable has been under continuous and sustained criticism since 1987," Vucanovich said. "Disputes about the safety of long-term, deep geologic disposal at Yucca Mountain are well documented, long-standing, and continue to this day."

EMERALD ISLE @ MOHAVE CO.

Of Mines And Men

Arimetco to acquire all of MacArthur property

Arimetco International Inc. and Brookline Minerals Inc. said May 20th that Arimetco and Holcorp Mines Ltd., a unit of Brookline, have entered into a share purchase agreement under which Arimetco will acquire all of the shares of Holcorp Ventures West Inc.

The principal assets of this subsidiary are a 50 percent interest in the MacArthur copper property and a note on Arimetco's Emerald Isle mine in the amount of (US)$750,000 and (C)$1 million.

MacArthur is about 5 miles from Arimetco's Yerington, Nevada mine. Arimetco now holds a 50 percent interest in the property, and the acquisition will allow for a consolidation of Yerington operations under a single management.

Oxide copper ore will be mined and leached at the MacArthur site and pregnant solutions pumped to the Yerington plant for processing via a 5-mile pipeline. Rehabilitation of the old solvent extraction plant is complete with work on the electrowinning facility 75 percent complete, Arimetco said.

Permitting at MacArthur is in progress, with estimated completion in July, the company added. MacArthur consists of 305 claims covering 6,100 acres with a openpit reserve of 40 million tons grading 0.22 percent copper. Included in this reserve is 8.3 million tons grading 0.43 percent.

Under the agreement, Arimetco will issue consideration to Holcorp Mines of 2 million common shares of Arimetco from its treasury.

JOHNSON (A) COCHISE, EMERALD ISLE (A) MOHAVE

Arimetco makes cuts to compensate for drop in copper price

Responding to a drop in copper prices, Arimetco International Inc. said September 29th it had instituted a number of cost-cutting steps "as cautionary measures in response to weakening copper prices."

At the Johnson Camp mine in Cochise Country, for example, waste mining had advanced about 6 months ahead of ore mining, so removal of waste has been suspended and mining costs thus "sharply" reduced.

In addition, the company said, reconfiguration of the heap leaching circuit will result in significant reductions in sulphuric acid use and pumping costs.

Along with other manpower and equipment savings, these changes will reduce the operating cash cost at Johnson Camp to about 65-70 cents per pound of cathode copper.

At corporate offices in Tucson, staff has been reduced by 20 percent and all officers have taken a salary cut. Roy Shipes, chairman and chief executive officer, has been working without a salary for the past 5 months. Other cuts, including the elimination of all company cars, also have been implemented.

The Emerald Isle mine in northwest Arizona was shut down in June because of low copper prices and high operating costs, but leaching of the ore heaps had continued.

Leaching now has been discontinued and the mine placed on care and maintenance. Arimetco said it will undertake an economic analysis to determine if the mine should be re-opened or sold.

The company is moving ahead with its 2 Nevada copper projects, however.

Construction of the first new heap leach pad at the Yerington mine is progressing on schedule, Arimetco said. It covers about 700,000 square feet. The compacted clay and HDPE liners are in place and lining of the collection ponds is in progress.

Vat leach tails are being placed over the synthetic liner as a protective layer. Loading of the pads with oxide ore was to start in early October, with pregnant leach solutions from the new pad reaching the Yerington plant by the end of the month.

The Yerington plant is expected to reach full capacity of 55,000 pounds of cathode copper a day during the first quarter of 1994, with an operating cash cost of 60 cents a pound.

Permitting for the MacArthur project near Yerington remains on schedule, Arimetco said, with all remaining permits expected by December 1st. A memorandum of understand has been intered into between the Bureau of Land Management and the Yerington Paiute Indian Tribe with respect to the tribe's participation in the permitting process and establishing the December 1st target date.

The addition of the MacArthur ore will allow expansion of the Yerington solvent extraction-electrowinning plant from a capacity of 55,000 ppd to 80,000 ppd of cathode and a further reduction in operating cash costs, the company said.

Arimetco lost $961,000 in the second quarter, compared with earnings of $432,000 a year earlier. For the first half, the company lost $1.2 million, compared with earnings of $48,000 in the year-earlier period.

Copper production in the second quarter of 1993 was 5.0 million pounds, compared with 4.6 million pounds in the first quarter, but the price for the commodity was 83 cent a pound, versus 95 cents in the earlier quarter.

Of Mines And Men

AMIGOS now using fax to talk with members

AMIGOS, Arizona's mine suppliers' trade association, started communicating with its members a new way in September.

To get information to members quickly — and cheaper than with mail — it is now faxing information.

A company that specialized in faxing provides the service for AMIGOS. Most of the faxes go out at night.

Other fax-based services from the trade association are expected in the future.

For more information on AMIGOS, contact Dan Miller at (602) 279-3199. Or fax him at (602) 230-1287.

Copper slump forces Arimetco to trim

VANCOUVER — Flagging copper prices have prompted **Arimetco International** (TSE) to cut costs.

Staff at the Tucson office was reduced by 20%, company cars were eliminated and officers suffered salary cuts. Indeed, Chief Executive Officer Roy Shipes is continuing to work without any salary, the company reports.

In June, Arimetco closed its Emerald Isle mine in northwestern Arizona, although leaching operations continued. Now even the leaching has ceased and the company is about to decide whether the mine should be reopened or sold.

Waste mining at the Johnson open-pit, heap-leach operation in southeastern Arizona has been suspended. At the end of September, waste stripping had advanced about six months ahead of mining of ore.

In conjunction with the operating changes, the heap-leach circuit was reconfigured to reduce acid consumption and pumping costs. As a result, operating costs at Johnson are expected to drop to US65-70¢ per lb.

Meanwhile, the Yerington mine near Reno, Nev., continues to operate. Arimetco is proceeding with construction of the first new heap-leach pad, with loading planned for early October. Yerington is expected to reach its capacity of 55,000 lb. per day during the first quarter of 1994, with cash operating costs projected at about US60¢ per lb.

The company expects to receive permits for its nearby MacArthur project by Dec. 1. MacArthur ore will allow for expansion of the Yerington plant to 80,000 lb. per day and a further reduction in operating costs.

For the six months ended June 30, Arimetco lost US$1.15 million on sales of US$10.2 million. This year's second-quarter loss was US$961,000 on sales of US$4.96 million.

The average realized copper price dropped to US83¢ per lb. in the second quarter from an average of US95¢ in the first.

Copper production in the second quarter reached five million pounds, bringing the 6-month total to 9.6 million lb.

As of June 30, Arimetco had about US$11.4 million in working capital and US$10.9 million in long-term debt.

Flag continues drilling in Sudbury

A second hole is under way at **Flag Resources'** Mackelcan Twp. gold property northeast of Sudbury, Ont. The hole is being drilled to test a mineralized breccia zone which the company says contains "significant anomalous gold values."

An earlier hole intersected 240 ft. of breccia with 3% sulphide, 15% quartz and 20% chlorite alteration.

The company also announced it will deepen a 2,700-ft. hole at nearby Laundry Lake. The hole will be deepened to 4,000 ft. to test the western magnetic peak of the Wanapitei anomaly.

Gibraltar, CAW reach agreement

VANCOUVER — A new collective agreement covering operations at the Gibraltar open-pit copper mine near McLeese Lake, B.C., has been signed by **Gibraltar Mines** (TSE) and Local 3018 of the Canadian Auto Workers Union.

The agreement covers operations through to March 31, 1996.

Assuming the feasibility study now under way is positive, the new contract paves the way for Gibraltar to proceed with expansion. Milling capacity will be boosted to 57,000 tons from 38,000 tons per day and cash costs will be lowered by an estimated US7-8¢ per lb.

Gibraltar has already raised enough funds for the $35-million expansion by selling 8.9 million common shares at $4.50 each to a group of underwriters. Net proceeds: $38.4 million.

Placer Dome (TSE), the company's largest shareholder, agreed to buy a further 1.9 million shares at $5.12 each. The purchase will reduce Placer's interest in Gibraltar to about 44% from 68.1%. This additional funding will be used to develop and acquire new copper projects.

Despite the recent copper price drop to US75¢ per lb., Gibraltar is confident the metal's price will improve over the long term.

President William Myckatyn noted demand for electronic equipment and other Western goods is increasing in the Third World and that world copper consumption is forecast to outstrip increasing production.

During the first half of 1993, Gibraltar's production cost averaged US81¢ per lb.

Crown Butte Res. awaits approval

Annual output at **Crown Butte Resources'** (TSER) New World project in Montana is projected to be 130,000 oz. gold. The company is awaiting a decision on an environmental impact statement which would enable it to develop a 1,500-ton-per-day underground mine.

Hemlo Gold Mines (TSE) has a 60% interest in Crown Butte and could claim about 78,000 oz. gold per year to its credit. An earlier story (*T.N.M.*, Oct. 4/93) confused the production projections.

Crown Butte's permit will allow it to mine only from underground, with mineral processing by gravity and conventional flotation circuits. Reserves from two deposits stand at 7.9 million tons averaging 0.25 oz. gold and 1.04 oz. silver per ton, and 0.74% copper.

Joe Baylis was recently named president of Crown Butte, succeeding David Rovig, who will remain a director.

Fairfield Minerals

on Humpy Lake despite the lawsuit. Loumic is claiming a 6.6% interest in Hum[illegible] says.

Elsewhere in the Northwest Territories:

☐ **SouthernEra Resources** (TSE) has agreed to option 300 claims held by **Fortune Minerals** (CDN) in the Lac La Martre area. By making cash

tion of a 95,000-acre claim block 70%-owned by **Thermal Exploration** (ASE).

Alberta

Rich Minerals (ASE) says ground magnetics designed to locate drill targets will begin immediately on its permits in Alberta. Meanwhile, the junior is conducting joint venture negotiations with a senior company.

hold
der
expl
Ont
the
joint
al-ba
Th
begi
land
as we

Emerald Isle Finance

The Northern Miner 5/3/93

Arimetco boosts MacArthur interest

VANCOUVER — Tucson, Ariz.-based **Arimetco International** (TSE) plans to acquire the remaining half of the MacArthur copper property in western Nevada.

The property, jointly owned by Arimetco and **Brookline Minerals** (VSE), is about five miles from Arimetco's Yerington mine.

Arimetco has rehabilitated the Yerington solvent extraction plant, and electrowinning facilities are 75% complete. Operating plans for MacArthur call for mining and leaching of oxide copper ores on-site, with the pregnant solutions pumped to the Yerington plant for processing.

Open-pit minable reserves are estimated at 40 milion tons grading 0.22% copper, including a higher-grade reserve measuring 8.3 million tons and grading 0.42% copper.

Arimetco will acquire the 50% interest through the purchase of Holcorp Ventures West which is owned by a subsidiary of Brookline. (Regulators must first approve the purchase.)

Holcorp Ventures holds $1 million in cash and a US$750,000 note on Arimetco's Emerald Isle mine in southwestern Arizona.

N.W.

Arimetco will issue a subsidiary of Brookline two million treasury shares for Ventures West, according to the purchase agreement.

High Frontier Res. revving up again

Subject to shareholder and regulatory approval, **High Frontier Resources** plans to consolidate its 8.26 million shares on a 4-for-1 basis and change its name to Consolidated Frontier Resources.

To settle a large portion of its debt, the company will issue post-consolidation shares.

The revived company will focus on exploration along the Goose Lake-George Lake trend in the Northwest Territo-

JOHNSON (H) COCHISE
VAN DYKE (A) GILA
EMERALD ISLE (A) MOHAVE

The Northern Miner 1/14/91

Arimetco gears up for jump in copper output by year-end

VANCOUVER — With a number of former copper producing properties containing known reserves in its fold, **Arimetco International** (TSE) is gearing-up for a big jump in copper production.

The company plans to go from its current production level of about 10,000 lb. copper per day to more than 100,000 lb. per day by year-end.

The company will use acid leach, solvent extraction and electrowinning technology to produce better than 99% pure cathode copper from its four properties in Arizona and Nevada.

Arimetco is currently producing about 10,000 lb. copper per day at its Yerington property in Nevada using stockpiled ore from a former operation on the site. The property was purchased from Anaconda Copper which mined more than 200 million tons of material. The stockpile contains in excess of 30 million tons of oxide material grading 0.25% copper.

Roy Shipes, president of Arimetco, said the company recently received permitting for the construction of a new leach pad which will allow for the expansion of the stacking operations from the stockpile to produce an additional 25-30,000 lb. copper per day.

The company also plans to begin leaching a large tailings pile containing at least 60 million tons grading 0.175% copper. The tailings-leach would add an extra 35,000 lb. copper production per day.

Shipes said the capital cost of the expansion is estimated to be US$4.5 million which he said would be funded from cash flow and the forward sales of copper product. He said the expansion should be complete by late June of 1991 with an overall production rate from Yerington of 60-65,000 lb. copper per day. Operating costs currently at about US80¢ per lb. should drop to about US55¢ when the operations reach full production, he said.

There is also an estimated 14 million tons of oxide ore remaining in the old open pit grading 0.33% copper. Shipes said the company does not have immediate plans to begin mining the reserve since the stockpiled material is expected to last about three years.

Yerington also contains a known deposit of sulphide material totaling 400 million tons grading 0.4% copper which the company has no plans to develop, but which is being treated as a longterm asset.

Arimetco operates a second copper operation 60 miles east of Tucson, Ariz. The Johnson mine, also a former producer, was purchased from **Cyprus Minerals** (NYSE) in early 1989. Arimetco began leaching operations in October of 1990, and at full production will produce about 30,000 lb. copper per day.

Reserves at Johnson include about 15 million tons of stockpiled oxide material grading about 0.3% copper plus about 10 million tons of oxide ore at about the same grade remaining in the pit. Production costs are expected to average about US35¢ per lb.

Arimetco also owns the Emerald Isle property about 15 miles northwest of Kingman, Ariz. The company is planning to construct an electrowinning plant on the property at a cost of about US$1 million to process an estimated 1.8 million tons of oxide reserves grading about 0.72% copper.

The plant will produce about 6,000 lb. copper per day, or about 2 million lb. per year, at an estimated cost of about US40¢ per lb. Shipes said he expects the plant will be completed by early April.

Arimetco's fourth property is the VanDyke, also located in Arizona, with reserves of 100 million tons grading 0.5% copper. The deposit is not open pittable; it lies at depths of 1,100-2,000 ft.

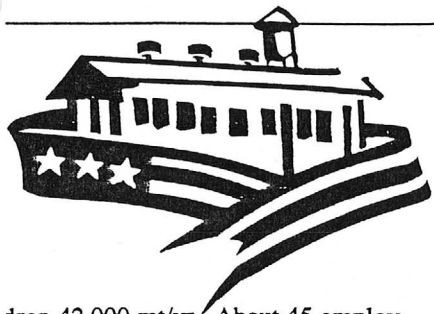
Occidental Minerals and the U.S. Bureau of Mines tested an *in situ* mining technique on the deposit in the early 1970s. The technique involves the injection of a solution of dilute sulphuric acid into the deposit through a series of wells, each surrounded by recovery wells which retrieve the resulting copper sulphate solution.

Although the tests were deemed successful and Occidental went ahead with plans to develop the property, the company was refused an operating permit by the town of Miami. Occidental subsequently dropped the lease.

Arimetco bought the property in July of 1990 from another group which was able to obtain permits for an in-situ operation. Shipes said the company is looking at the feasibility of bringing the deposit into production.

Arimetco currently has about 17.5 million shares outstanding plus 2.2 million warrants exercisable at $1.75 to December 1991.

U. S. Industry



ADVANCED MATERIALS

Hughes Electronics Introduces Sapphire-on-Silicon Transistors

GM Hughes Electronics Corp., a subsidiary of Hughes Aircraft Co. of Los Angeles, CA, has introduced a new metal-oxide-silicon field effect transistor (MOSFET) that employs sapphire-on-silicon technology. Company officials state that this new technology allows devices to operate with cutoff frequencies exceeding 20 gigahertz and allows for further miniaturization of microwave shifters and microwave and millimeter-wave monolithic integrated circuit amplifiers. — *George M. Russell, 202-634-7192.*

ALUMINUM

Alcoa Curtails Restarting Idled Potlines; Supply Problem Cited

Aluminum Co. of America (Alcoa) in late July delayed restarting any idled potlines at its U.S. primary aluminum smelters because of problems with alumina procurement. Worldwide alumina supplies were tight because of capacity and near-capacity production rates of smelters in the United States and abroad. Under the moratorium, individual pots or cells at any of Alcoa's U.S. smelters would not be restarted if they went down for any reason--maintenance or otherwise. Potlines are usually shutdown every 1,000 days or so for relining and other maintenance procedures. Alcoa's U.S. primary aluminum capacity was rated at 1.155 million metric tons (mt) at that time. Since most U.S. smelters have been running at capacity or near capacity since late 1987, it is unknown how much Alcoa's capacity will be affected by the moratorium or when it can resolve its alumina procurement problems.

Alcoa shut down one of five potlines at the Wenatchee Works, Wenatchee, WA, during the first week of August. Power supply concerns and a strike at a Jamaican plant that provides alumina were cited as the causes. Other than a 1-month strike in 1986, it is the first time since 1983 that the Wenatchee plant production has been cut. Aluminum production was expected to drop 42,000 mt/yr. About 45 employees were laid off at the plant. Prior to Alcoa's action, all 42 aluminum potlines in the Pacific Northwest were operating. — *James J. Hill, 612-725-4534; William A. Lyons, 509-353-2726.*

CEMENT

Lafarge Corp. Purchases Plant and Distribution Terminals

Lafarge Corp., a Virginia-based manufacturer of cement and concrete products, has completed purchase of Lehigh Portland Cement Co.'s plant at Metaline Falls, about 90 miles north of Spokane, WA, and distribution terminals in Spokane and Pasco, WA, and Missoula, MT. The plant was sold for about $6.9 million and the Spokane distribution terminal for about $530,000; about 65 people are employed at the plant. — *William A. Lyons, 509-353-2726.*

COBALT

Purchase of Blackbird Cobalt Mine Apparently on Again

Noranda Inc. and M. A. Hanna Co. announced in mid-September that an agreement had been reached to sell the idled Blackbird cobalt mine, Lemhi County, ID, to Blackbird Metals Inc. by yearend 1989. According to the American Metal Market, no purchase price was disclosed, but Blackbird Metals' total investment reportedly would approach $90 million, and includes building an off-site refinery about 50 miles away near Salmon, ID. Refinery capacity was estimated at 5,000 short tons per year (st/yr) of cobalt. About 50% of the feedstock would come from the mine and the remainder would be purchased elsewhere. U. S. consumption of cobalt is about 9,000 st/yr. — *William A. Lyons, 509-353-2726.*

COPPER

Arimetco Plans High-Grade Cathode Production in Nevada

Arimetco of Tucson, AZ, will begin producing high-grade cathode copper in Nevada by 1989. The firm will use solvent extraction-electrowinning (SX-EW) methods to recover copper from three recently acquired mines. By late 1990, combined copper production is expected to be nearly 16,000 mt/yr.

The Yerington Mine, in Lyon County, NV, will be the first to come online. The company expects production of cathode copper at the mine to begin in late 1989. A $3 million SX-EW facility was constructed to produce 11.3 mt/day and an additional $4.9 million will be spent to increase the production to 27.2 mt/day by early 1990.

In addition, about $3 million will be invested for a new SX-EW plant at the Johnson Camp Mine in Cochise County, AZ. The plant should be operational early 1990, producing 13.6 mt/day of cathode copper. Cyprus Minerals Co. closed this SX-EW plant in December 1986. The new operation has a 6-year life.

JOHNSON (FILE) COCHISE

The company also planned to produce 3 mt/day of cathode copper by mid-1990 at the Emerald Isle Mine in Mohave County, AZ. This facility currently produces about 1.8 mt/day of cement copper. The operation will be converted to a SX-EW facility.

EMERALD ISLE (FILE) MOHAVE

Arimetco was established as a privately held corporation in October 1988 by H. Roy Shipes, former CEO and general manager of OK Tedi Mining Co. of Papua New Guinea. — *Michael N. Greeley, 602-670-5110.*

Phelps Dodge Corp. To Expand Morenci Mine Operations

MORENCI COPPER (FILE)

Phelps Dodge Corp. announced in August a $112 million expansion project at its Morenci Mine in Greenlee County, AZ. The expansion will increase production at the mine by 63,000 mt/yr of electrowon cathode copper. The project is scheduled for completion by mid-1991.

The Northwest Extension ore body will be developed to increase production. New mining equipment will be purchased and capacity of the solvent extraction - electrowinning (SX-EW) plant will be expanded from 91,000 mt/yr to 154,000 mt/yr.

Oxide ore, overlying sulfide mineralization, will be mined initially. This

erated as the main vehicle for Anglo American's natural resource investments outside South Africa.

"Until recently, Minorco's interests consisted almost entirely of minority holdings with the group having little or no management involvement," says Liz Dhillon, an analyst with *Carr Kitcat & Aitken Ltd.* of London analyst Liz Dhillon.

But according to Dhillon, the appointment this year of Bill Brown as a director and consultant, and Gerard Munera as chief executive of Minorco (U.S.A.) must be seen as sign that things are about to change.

Munera is a former head of corporate planning and development at British mining conglomerate Rio Tinto Zinc, while Brown is a former chief executive of Gold Fields

Hayes Resources is a New York oil and gas company.

Minorco has $1.7 billion in cash available for acquisitions that have the correct strategic fit, Fricklas told *The Northern Miner* recently. But he declined to predict the timing or nature of any new acquisitions that may be under consideration.

He also refused to comment on rumors linking Minorco with a possible takeover of Toronto-based companies **LAC** (TSE) and **Hemlo Gold** (TSE).

However, Dhillon believes the recruitment of Brown signals Minorco's intention of using Independence as a base for further expansion of gold operations in the U.S. "It is highly probable that Minorco still wishes to acquire Gold Fields Mining from Hanson," she said.

EMERALD ISLE (F) MOHAVE CO. MAKE CARD OF SOLO PETROLEUM

Arimetco selling Arizona copper property

VANCOUVER — After backing out of two non-resource ventures, **Solo Petroleum** (ASE) announced plans to buy an Arizona copper property from **Arimetco** (TSE).

The Emerald Isle property, northeast of Kingman, has obtained all necessary permits for a heap leach or *in situ* leaching operation. Total reserves on the property are estimated at 6.4 million tons grading 0.42% copper.

The purchase price of the Emerald Isle mine is US$3.75 million, of which US$100,000 is payable by Nov. 29; US$2 million within 120 days of that; and the balance payable by a 13% debenture. The debenture is amortized over a 3-year period and is payable in equal monthly instalments.

Construction of a solvent extraction-electrowinning plant capable of producing 8,000 lb. of copper per day will begin as soon as the initial payment is made to Arimetco.

Solo Pe
producing
first quarte
ing cost est
of copper,
realize an
order of U

B

ORACLE RIDGE (F) PIMA CO.

Oracle Ridge startup hindered

VANCOUVER — Development of the Oracle Ridge project is reported by owner **South Atlantic Ventures** (VSE) to be substantially complete, although startup has been delayed by problems with the ball mill alignment.

The project, 15 miles northwest of Tucson, Ariz., includes underground mine development and mill construction for a 285,000-ton-per-year operation.

President Lutz Klingmann reports mining operations are continuing with ore being stockpiled on surface while the ball mill is readied for startup.

He also noted underground development of Block 7 is continuing and the actual grade of material mined to date is higher than reserve grades. Reserves were last reported at 4 million tons grading 2.33% copper and 0.67 oz. silver per ton plus associated gold.

At full [illegible] should produce about 11.3 million lb. copper. 151,000 oz. silver and 2,200 oz. gold.

As of Oct. 11, the company had drawn down US$3.5 million of its US$5 million credit facility. Total budget for the project is US$6 million.

Nevada reports quarterly loss

VANCOUVER — A loss of US$2.06 million was reported by **Nevada Goldfields** (TSE) for its first quarter ended Sept. 30. A loss of US$1.16 million was reported for the same period in 1989.

The company sold 5,206 oz. of gold and 23,664 oz. of silver over the period for net operating revenues of US$2.2 million. Net cash provided by operating activities in the latest quarter was US$326,000.

expected shortly.

Hy[illegible]t third quarter increase

VANCOUVER — An increase in third-quarter earnings to $1.4 million from $1.1 million in 1989 could not keep **Hycroft Resources & Development** (VSE) out of the red.

The company reported a loss of $262,000 for the nine months ended Sept. 30, a significant improvement over the loss of $3.7 million incurred in the 1989 period.

Hycroft achieved record gold production during the third quarter with 26,214 oz. produced compared to 24,028 oz. in 1989.

The increase was tied to the startup of a new leach pad coupled with improved ore leachability at the Crowfoot/Lewis mine in Nevada.

The drop in 9-month losses was also related to non-recurring losses in 1989. The company reported a foreign exchange loss of $1.27 million and an income tax expense of $503,000 for the first nine months of 1989.

Tonnage growing on Biron Bay bet

Recent exploration drilling by
y **Resources** (ASE) has
preliminary reserves on
any's 60% owned Sum-
project in New Mexico.
d **Resources** (TSE) holds
ning interest in the prop-

says stepout drilling on
rty's main Summit vein
nded initial reserves to
[illegible] tons with an average uncut grade of 0.18 oz. gold and 11.62 oz. silver per ton. Reserves were previously estimated at around 800,000 tons. At current metal prices, the new figure represents a gold equivalent grade of 0.31 oz. gold. The average true width of the high-grade core is 13.5 ft., but the surrounding walls also contain some gold and silver values.

Results from the latest batch of stepout holes in the Summit vein include 33.5 ft. grading 0.056 oz. gold and 3.5 oz. silver; 20 ft. grading 0.022 oz. gold and 2.4 oz. silver; and 28 ft. grading 0.29 oz. gold and 15.2 oz. silver. The Summit vein is still open to the north and at depth.

Another mineralized zone, 4,000 ft. north of Summit, has an initial inferred reserve of 219,445 tons grading 0.24 oz. gold and 12.8 oz. silver.

the first 18 hole
program on the Pinc
have owner Cro
(VSE) optimistic a
erty's potential.

Significant res
program are listed
says for the balanc
pending.

Crown recently
100% interest in the

PanAmerica
Mexican opp

Taking advantage
new mining regu
American Mineral S
oming says it plans
reverse circulation
companies exploring
ish-speaking country

John Simons, th
general manager, sai
circulation rigs are cu
able to the mineral ind
ico. PanAmerican is
country, where it prov
cal and hydrological s

The new regulation
go into effect Dec. 10.
line procedures for o
maintaining mining co
Mexico.

The Northern Miner 12/10/90 Page 13

2 of

Emerald Isle (F) Johnson [redacted] (F) Sol (F)

Arimetco using S EW to rejuvenate th e old copper mines

By Karen Walenga
Staff Reporter

A new, Tucson-based mining company plans to develop solvent extraction-electrowinning operations at three established copper properties that it recently acquired in Nevada and Arizona.

Arimetco Inc. (The Arizona Metals Company) is the new owner of the Yerington mine in western Nevada, the Johnson Camp mine in southeastern Arizona, and the Emerald Isle mine in northwestern Arizona.

By next year, the company expects to be producing a total of 96,000 pounds per day of cathode copper from the three projects.

Arimetco president and founder, H. Roy Shipes, a mining veteran with worldwide experience in the industry, also foresees further development and expansion of the company in the future.

Currently, Arimetco is planning to:

—Produce 25,000 pounds daily of high-grade cathode copper as of this fall at the Yerington property in Nevada's Lyon County, with production increasing to 60,000 ppd early next year.

—Produce 30,000 ppd of high-grade cathode copper at the Johnson Camp site in Arizona's Cochise County as of early 1990.

—Produce 6,000 ppd of cathode copper by mid-1990 at the Emerald Isle property in Arizona's Mohave County after switching from existing copper precipitate production.

At the Yerington project, a former ARCO-Anaconda property located southeast of Reno at the community of Yerington, a new 25,000-ppd SX-EW plant currently is 99 percent complete, Shipes told *PAY DIRT* August 29th.

The company is spending approximately $3 million for the new SX-EW facilities and a crushing plant for the project. Another $4.9 million subsequently will be invested to add another 35,000-ppd SX-EW plant at Yerington as well as for related mining equipment, leaching facilities, engineering, and working capital, according to the president.

Former Anaconda operations

Arimetco purchased Yerington—a long-time Anaconda property—in May from a Yerington businessman, who in turn had bought the property in the late 1970s from Anaconda's parent company, Atlantic Richfield (ARCO), after ARCO closed the copper operation. The businessman had been an ARCO employee and also had worked as a contractor for ARCO at the property, Shipes noted.

Arimetco now has a total of between 8,000 and 9,000 acres of claims at Yerington. There are approximately 400 million pounds of readily recoverable copper, of which 85 percent already has been mined, Shipes pointed out, noting that the current life expectancy for the project is 14 years. Plus, the property contains "a couple more" orebodies as well as old underground workings which the company will explore in the future.

At present, Arimetco—which resumed openpit mining at Yerington in late July—is placing ore on a leach pad and applying leaching solution. The company planned to begin pumping pregnant solution to the SX-EW plant by mid-September, with the first cathodes pulled in early October.

For this first stage of operations at Yerington, between 2,000 and 3,000 tons of ore per day will mined from the openpit, plus 5,000 tpd will come from an oxide ore stockpile. The mining rate will increase after the stockpile is depleted.

The second stage of Yerington operations will encompass the second SX-EW plant, which will have a 35,000-ppd capacity. To supply this plant, the company will use an 80 million-ton stockpile of vat leach tailings that still have a 0.2 percent copper content.

Overall production costs for both phases of operations are expected to average 56 cents to 57 cents per pound of cathode copper.

The company will employ 35 workers for the first stage of operation, then add 25 more for the second stage of production.

Historic Arizona producer

Arimetco's new Johnson Camp project in Arizona is a former Cyprus Minerals Company property located just north of Interstate 10, about 15 miles east of Benson.

The company plans to invest approximately $3 million in a new SX-EW plant and related mining equipment to produce 30,000 ppd of cathode copper. Commissioning of the new facilities is to take place early next year.

Also under consideration is a two-stage crushing plant, the president said, noting that the company initially proposed a 25,000-ppd operation at the site, but the cost difference was minimal for the extra 5,000-ppd capacity.

Arimetco bought the Johnson Camp site in early August from Cyprus, which had ceased openpit mining and leaching operations at the property in the mid-1980s.

Johnson Camp, a historic Arizona mining site dating back to before the turn of the century, has reserves consisting of two ore heaps with approximately 125 million pounds of both sulphide and oxide copper, plus about 2.5 million tons of ore in the openpit mine averaging 0.8 percent copper, Shipes said.

With the mine and the heaps, Johnson Camp now has an estimated six-year life. In addition, the property also contains another deposit which the company will investigate in the future for possible leaching and SX-EW output.

Arimetco's affiliate, AMPAC Mining Southwest, will be constructing the new SX-EW plant at Johnson Camp. Plans are to recrush and regrind the existing ore heaps and leach that material for the first year or two of production. Then, the openpit mine will be reopened sometime in 1991 at a production rate of 3,000 to 4,000 tpd.

A 30-member work force is predicted, and production costs should average 57 cents per pound.

Emerald Isle to use SX-EW

The Emerald Isle project near Kingman is an in situ property slated for a new 6,000-ppd SX-EW plant in mid-1990.

In the meantime, Arimetco is refurbishing the existing copper precipitate facilities at the site and will continue precipitate production to help generate funds for the company's new projects.

The company acquired Emerald Isle in June from TSC Enterprises Inc., which in turn had bought the property from El Paso Natural Gas.

The Emerald Isle in situ leach operation was developed in the late 1970s by the U.S. Bureau of Mines in cooperation with El Paso Natural Gas, Shipes said. He noted that he had held a 50-percent interest in Emerald

Editorial . . .

Valley taken 50 or 60 years ago, then look at the same area today. The usual slogan: "You can't stop progress" coupled with "planned development."

What happened to these Reno landmarks: McKissick Opera House, The Wine House, Becker's Northside (and Billinghurst) Junior High, Majestic and Grand (not Granada) Theatres, to name just a few of the real places of interest that marked the "old Reno."

Our more cultured, adventurous cousins in the cities can demolish all the landmarks they wish—in their own territory—without seeking our opinion—but when they insist upon dictating whether we should maintain a "ghost camp" or two for their convenience, even if it means loss of hundreds of jobs to those employed in the mining industry, we prefer a more apropos solgan: "Buzz off, Bucko" and let us choose whether we wish to live and die in a ghost camp—or in an area where the mining industry had brought those "ghosts" back to life.

A little girl whose family was moving from Aurora to Bodie is supposed to have knelt and said; "Goodbye God, we are going to Bodie" but once in Bodie she explained she had said, "Good, by God, we are going to Bodie."

We are happy to learn that some mining companies, like that little girl, believe there is still a chance to revive mining between Aurora and Bodie even though not in the old town itself. We wish them success.

(Editor's Note: Mr. McCloskey is the long-time editor of the *Mineral County Independent-News* in Hawthorne, Nevada. His editorial is reprinted from the August 9th issue of that newspaper.)

pulled a little coup here," Sandoval concedes.

Cyprus did vithout the usual strong-arm tactics. To w the hearts and minds of the union work force, the company, led by labor history, after all, encompas massacres of kers at Matewar Virginia and L w, Colorado early century. The industry also nursed th

Arimetco . . .

Isle, then this summer bought the company that owned the other half.

The property contains 26 million pounds of oxide copper in ore averaging 0.7 percent copper.

Arimetco now is refurbishing the precipitate facilities at Emerald Isle by adding a second cone for processing the pregnant solution as well as installing new lines from the mine to the plant.

The firm is preparing to resume production at a steady rate of approximately 4,000 ppd. The precipitate output will be processed at the Cyprus Miami copper smelter in Arizona.

When Emerald Isle switches to SX-EW operations, production costs are expected to be less than 50 cents per pound.

Arimetco, a privately held corporation specializing in mining and production of nonferrous metals, was established in October 1988.

Shipes has found a niche

Prior to forming Arimetco, Shipes had been president and co-founder of American Pacific Mining Company Inc., which reopened the El Mochito lead-zinc-silver mine in Hon He also has served as CEO and g manager of Ok Tedi Mining Compa Papua New Guinea, and as vice pres general manager of operations for Sou Peru Copper Corporation.

"I intend to build a major mining com and have found a niche to take advanta and get a cash flow" started to fur develop and expand Arimetco, Shipes poi out.

The company is aggressively looking other properties as well, he said, noting Arimetco has filed a claim for the Sol pro ty in Arizona, a former joint venture betw AMAX Inc. and Phelps Dodge Corporat located near Safford.

Part of Arimetco's strategy now is to foc on copper properties that are small in co parison to the major operations.

"I can't speak for the larger companies, b there is a threshold where it's not practic for (large) companies to get into propertie this size because there's little effect on thei bottom line," he noted.

STOCK MARKETS

MOST ACTIVE ISSUES, APRIL 1-7

		Volume (000s)	High	Low	Close	Change
United Pac Gld	V	3686	34	13	33	+ 21
Breakwater Res	T	2586	75	52	66	+ 14
Aur Res Inc	T	1763	255	195	238	+ 33
More Res	V	1340	80	53	63	+ 8
Intl Corona	T	1282	490	465	480	+ 10
LAC Minerals	T	1267	$7 1/4	6 7/8	7 1/4	+ 1/4
Gulf Cda Res	T	1117	$6 3/4	4 7/8	6 3/4	+ 1 7/8
Intl Petroleum	T	1044	$7 1/8	6 1/4	7	+ 1/2
Kalahari Res	V	1026	40	17	29	+ 10
Melinga Res	V	985	82	68	80	+ 11

GREATEST VALUE TRADED, APRIL 1-7

		Volume (000s)	High	Low	Close	Change
Inco Ltd	T	24574	$34 7/8	33 1/2	33 1/2	- 1 3/8
Amer Barrick	T	18334	$29 3/4	29 1/8	29 3/4	+ 5/8
Teck Ltd B f	T	10432	$17 1/2	17 1/8	17 1/4	+ 3/8
Placer Dome	T	9669	$11 1/2	11 1/8	11 3/8	+ 3/8
LAC Minerals	T	8331	$7 1/4	6 7/8	7 1/4	+ 1/4
Potash Corp	T	7923	$24 1/4	23 1/4	23 3/8	- 5/8
Cominco Ltd	T	7781	$20 3/8	19 5/8	19 7/8	- 3/8
Taseko Mines	V	4859387	$15 1/4	13 1/2	14 1/2	- 1/2
Intl Corona	T	4613520	490	465	480	+ 10
Cameco Corp	T	4095187	$17 5/8	16 7/8	17 1/2	+ 1/2

GREATES

Wstn&Pac Res
United Pac Gld
Auckland Expl
007 Prec Metal
Intl Constat
Alaskon Res
Cactus West
Micron Met.....
Wht Gld Vent .....
Sudbury Cntct.....

Holcorp plan rocks Arimetco

EMERALD
SUE-monitor

by Peter Kennedy
The Northern Miner

A stellar performer of late, oxide copper specialist **Arimetco International** was rocked by some bad news during the week ended April 7 after hitting a new high of $5.75.

Arimetco has been something of a favorite among analysts since Billiton Metals agreed to market cathode copper output from the company's in-situ leaching operations in the U.S. Arimetco's low for the year is $3.10.

This week, Holcorp Mines said it is withdrawing a preliminary prospectus for a $4 million offering designed to secure the financing it needs to buy two copper properties (in Arizona and Nevada respectively) from Arimetco.

Investor reaction shaved 50¢ off the Arimetco issue which fell as low as $4.95 before settling at $5. Employees at Holcorp weren't returning telephone calls. As indicated by this week's market activity, conditions aren't getting any better for juniors. Making matters worse were a number of factors including the slump in Japanese share prices, the Olympia and York debacle and more indications that the hoped-for rebound in the economy isn't materializing.

Today, April 8, share values were down for the second day in a row, before the composite 300 closed down 18.51 points at 3318.10 after 27.3 million shares worth $286 million changed hands.

However, Holcorp officials may have been consoled by the fact that it isn't just mining industry minnows who are being affected by the economic situation. Down 13¢ to $32.88, **Inco** is cutting nickel output by suspending operations at its Shebandowan mine near Thunder Bay, Ont., and laying off 360 workers. Trading at US$3.36 per lb., nickel is just slightly ahead of Inco's break even price. Down 38¢ today to $19.50.

In the precious metals sector, **American Barrick Resources** and others were hit by this week's US$6.25-per-oz. decline in the price of gold which closed today in London at US$337.50. Barrick fell by $1.50 in a 24-hour period to finish at $28.25. **Echo Bay** touched a new low of $6.88 before settling at $7. In a week during which nearly all of the metals were down, platinum was the biggest casualty. It plummeted to US$348 from US$360.25 a week earlier.

From the Montreal Exchange, **Societe d'Exploration Miniere Vior** continues to report encouraging assays from drilling of a zone at its wholly-owned Douay gold project in northwestern Quebec. The company has two drills at work there. Trading 5,500 shares, Vior closed down 2¢ today at 45¢.

United Pacific

by Vivian Danielson
The Northern Miner

VANCOUVER — Claiming top spot as the most active issue on Canadian exchanges for the week ended April 7 was **United Pacific Gold** (VSE). During this period, the Vancouver-based junior mining company posted a gain of 21¢ to settle at 33¢. The trading activity is related to the company's involvement in the Dipore tailings project in the Philippines, which is reported to have about 5,000 tons of stockpiled tailings grading 0.5 oz. gold and 8 oz. silver per ton.

Company President Reno Calabrigo announced in late March that the company is renegotiating its option agreement on the Dipore gold project with joint venture partner Eaglerock Mining. In the meantime, the companies plan to begin production at an 11-ton-per-day pilot plant, which will then be expanded to 38

tons
fully
to d
func
of 1.
K.
dim
start
Chil
pros
tenti
dent
hits
for s
be a
who
of pr
ern U
Ta
the h
tradi
share
endin
is dri
Fish
Willi
to ve
minin
proce
an op
for se
The
gary
with
well a
Sourc
the tr
invest
Sev
saw s
Naxos
a new
compa
ject ai
alluvia
nia's D

Changes designed for easier use

Changes introduced to our stock trading tables this week are designed to make them easier to use while continuing to provide the most comprehensive listing of weekly stock quotations for mining securities and providing more space for mining news.

Because readers often know the name of a stock but not the exchange on which it trades, we have combined all stock trading into one table and listed them by company in alphabetic order. For interlisted stocks (those that trade on more than one exchange), the quote from the exchange on which it is most actively traded is used. The exchange from which a stock quote is taken is designated in the second column, after the company name.

Those stocks that did not trade during the week or traded less than 100 shares are included in a separate bid-and-ask table, again listed alphabetically regardless of exchange. Bid-and-ask quotes now also include a column giving the price of the last trade.

We have also introduced new summary tables that give the 10 most active issues during the week, the 10 issues that trade the greatest value, and the 10 that reported the greatest price swings in percentage terms either up or down.

Legend: Stocks that trade over $5 during the week are designated by $ before the high-trade column and are reported in eighths of a dollar; T-Toronto Stock Exchange; M-Montreal Exchange; V-Vancouver Stock Exchange; A-Alberta Stock Exchange.

Selling pressures push down gold

CACTUS (P) GILA, CARLOTA (P) GILA, EMERALD ISLE (P) MOHAVE VAN DYKE (P) GILA

Cambior plans Miami mine as interest in SX-EW grows

By Gary Dillard
Staff Reporter

Taking advantage of the promise of a few years of strong copper prices and the ever-more-popular hydrometallurgical process for acid-soluble ores, a Denver-based company may soon be another Arizona copper mining company.

Cambior USA Inc., parent of the former Westmont Mining Inc., says it hopes to have its Carlota property in the Globe-Miami area producing cathode copper by the first quarter of 1994.

Alex Bissett, president of the Denver-based subsidiary of Cambior Inc. of Quebec, said the feasibility study for the $50 million project should be completed by September and permitting could be finished as early as mid-1993.

The mine-for-leach and solvent extraction-electrowinning operation would produce 20,000 to 25,000 tons of copper a year, he said, with a lifespan of 12-15 years.

The mine, which would comprise 3 separate, but close-in, openpits, has reserves of about 66 million tons of oxide ore grading about 0.49 percent copper. Drilling was expected to be completed by the end of April, he said, adding that "we expect those reserve figures to expand somewhat when we input the latest drilling results."

The company expects to produce cathode copper for a total per-pound cash costs "in the 60-65-cent range," Bissett said.

The Carlota claims date from around the turn of the century, according to Dick Mieritz, agent for the claims' owner, Sherwood B. Owens of Tucson, and a historian of the area.

The claims were located for their copper content, he said. At that time, "there was a little scratching, but not very much."

The claims were mined, by underground methods, during World War II, with high-grade ore being sent to Miami for smelting.

Another owner tried to make it as a small leaching operation, producing some cement copper in the early '70s, Mieritz added. A small openpit is evidence of that work.

In the mid-'70s, he said, a Canadian outfit tried to make the property marketable. That effort ended up in a court proceeding, and Owens acquired the property in 1977.

In 1988, Owens cut a deal with Westmont, the Cambior predecessor, to sell the Carlota and Dickerson claims, a process that's still under way.

Meiritz said there are "many versions" of the spelling of Carlota, but he believes the one used here is correct. He said he didn't know for whom the claim was named.

Westmont acquired in 1988

Bissett said Westmont acquired the first piece of its current holdings in the area, the Carlota group of claims, in 1988. The drilling which is "just now being completed" started soon afterwards.

To round out its holdings in the area, Westmont acquired a lease on one parcel from Magma Copper Company and another from Cyprus Minerals Company in 1990. It acquired a lease on the Cactus orebody in 1991.

The Cactus and Carlota will be the first 2 pits to be developed. The third will be the 2 existing Eder pits on property acquired from Cyprus. "They are all very close together," Bissett said.

Mine development will be quick, he said, because there is "a lot of ore quite close to the surface."

The Carlota was owned by Westmont when the company was purchased by Cambior for (US)$10 million last August. Cambior USA will pay another (US)$5 million to the previous owner when commercial production is under way.

The Denver-based company is looking for more copper reserves, Bissett said. The operating company for the mine project is Carlota Copper Company, which will be based in the Globe-Miami area.

Cambior, which commenced operation in 1986, produced about 313,000 ounces of gold last year from mines in Canada and Alaska. The company is now developing the Omai gold project in Guyana. That (US)$163 million project could add another 262,000 ounces of production in 1993, when the company plans to surpass the half-million-ounce mark.

Cambior had net earnings of (C)$13.9 million on revenues of (C)$169.1 million last

Cambior plans . . .

year. It spent (C)$9.2 million on exploration in 1991, including (C)$2.7 million in the United States, looking for metals in Washington, Oregon, Idaho and Nevada.

Other than the properties it acquired with Westmont, Cambior's only other non-gold property is the Niobec mine in Quebec, the only operating niobium mine in North America. It holds the property with Teck Corporation, the operator. Niobium is a steel alloy.

Optimistic on permitting

Bissett said he is optimistic that permitting will move ahead on schedule. The main permitting agency for Carlota is the U.S. Forest Service, which manages the surrounding Tonto National Forest.

When in operation, the mine would require about 225 full-time employees with an annual payroll of $6 million. Cambior has spent about $2.5 million at the property so far.

Bissett is no stranger to copper oxide orebodies. In 1974, he was named project manager for Conoco's Poston Butte project near Florence. That 822-million-ton deposit consisted of sulphide ore beneath a zone of acid-soluble oxide.

Conoco spent about $25 million on a 30-month pilot project. The company said the tests were encouraging, but a large aquifer presented major water problems.

In 1982, as a depression hit both of its primary interests — copper and uranium — Conoco got out of the minerals business, but it still holds on to its Poston Butte deposit.

Bissett, who graduated from the University of Nevada and worked for Pima Mining Company and Similkameen Mining Company before joining Conoco, worked for a bank and another mining company before assuming the helm at Westmont.

Much interest in oxide ores

The Carlota announcement isn't likely to be the last news about potential oxide copper development this year. With predictions of copper prices near the dollar-mark through the rest of the decade, copper is a good commodity for a mining company.

A strong technology backing up the low-cost solvent extraction-electrowinning process can return capital costs quickly and on relatively small orebodies.

N.J. Niemuth of the Arizona Department of Mines and Mineral Resources says that during this February's SME convention in Phoenix, his office had "tremendous visitation from company geologists" looking for oxide orebodies.

Historically, most companies have looked for large copper orebodies, (though some, like the old Ranchers Exploration and Development Company, made a business on getting in and out of small deposits quickly), but now that appears to be changing.

"Some of the companies are willing to look at a small deposit," Niemuth said.

In its annual copper report, DMMR lists a host of small and not-so-small orebodies around the state amenable to leaching. With the shortfall in copper-smelting capacity that promises to hold through most of this decade, about the only way a company can get into small-scale copper production without losing much of the potential profit in smelting fees is through SX-EW.

Not all orebodies can be leached, of course, but the DMMR report breaks out those that are oxides or acid-soluble sulphides. Of these, there are a number, some with reserves of as little as 2 million tons, like the Korn Kob North orebody, and going on up to the Santa Cruz, with 800 million tons, where in situ leaching technology is being tested by a joint venture of industry and the U.S. Bureau of Mines. Most of the rest fall within this range.

One larger-scale operation that's in the wings is the Arizona Copper Company's (AZCO) Sanchez project near Safford. Though financing isn't in place yet for that SX-EW operation, permitting is well under way and the company has gotten strong support from local residents.

Another company with a strong presence in small-scale SX-EW operations is Tucson-based Arimetco International Inc., which is expected to have the next leaching operation on line in Arizona.

Already producing cathode copper at the Johnson mine in Cochise County, the company has completed construction of an 8,000 ppd plant at the Emerald Isle property in central Mohave County.

Alan Matthews, the company's director of corporate development, told *PAY DIRT* in late April that it is quite close to receiving an operating permit. The company has been negotiating the sale of Emerald Isle, but it appears Arimetco will be operating the property itself.

Arimetco produced a little cement copper there in 1990, but was deterred from continuation of that activity by high smelting costs.

Emerald Isle had been operated as an openpit by El Paso Mining & Milling Company, but that company stopped mining in 1973 and tests of in situ leaching in 1975.

Matthews said Arimetco originally was going to use in situ leaching exclusively, but now plans leach pads that will provide about 30 percent of the feed.

During plant construction, Matthews said, the company found a high-grade zone on the east end of the pit. It also will be using El Paso's waste dumps. That company had a cut-off grade of 0.5 percent copper, but with

(over)

Cambior plans . . .

leaching, Arimetco's cut-off will be 0.2 percent.

Capital cost for the Emerald Isle SX-EW operation is expected to total $750,000-$800,000, Matthews said, which can be paid off in about 2 years. Some of the plant was salvaged from the company's Yerington, Nevada operations and some was manufactured specifically for the project. To contain costs, Arimetco uses its own construction team.

Arimetco is aiming for the same production costs that it has at Johnson, about 60 cents a pound.

Emerald Isle has reserves of 2 million tons grading 0.72 percent copper, according to the Arizona Department of Mines and Mineral Resources.

Arimetco has another in situ leach, SX-EW project it is working to bring on line close to Cambior's Carlota. The Van Dyke, a 110-million-ton oxide orebody grading 0.51 percent copper, underlies the town of Miami.

Arimetco is currently reworking the 1,400 foot shaft that accessed the ore in earlier work with the idea of using it as a production well for in situ leaching.

Crews are now rehabilitating the first 300 feet of the shaft to remove a blockage. Matthews said the company believes the blockage is just fallen timbers.

After that, rehabilitation will be done on down to the water level, where a pump could be set up for pumping pregnant solution to the surface. Earlier in situ production from Van Dyke was interrupted by the need to pull the pump from a production well for servicing, he said. By using the shaft as the production well, servicing could be done in place.

(One former operator at Van Dyke, Kocide Chemical Corporation, produced cement copper there for about 10 months in the late 1980s, turning a small profit during a couple of those months.)

Arimetco also envisions driving injection drifts from the shaft to reach the old stope and fresh ore.

Because of its location, considerable permitting will have to be achieved to get the Van Dyke in operation.

Of Mines And Men

Ranchers file countersuit against Pegasus Gold

Owners of the Lone Mountain ranch have filed a countersuit against Pegasus Gold Corporation, which is proposing development of an openpit mine on the property near Santa Fe, New Mexico.

The counterclaim filed April 8th in U.S. District Court in Santa Fe by Marion Lloy Illinois and her daughter, Mary Lloyd E of California, contends Pegasus has obligation to use the ranch land i reasonable manner. Pegasus has the min rights on the property in the Ortiz Mount south of Santa Fe.

Pegasus filed suit earlier this year cl ing the ranch owners had applied to the s for irrigation water rights only to block company's water plans. In t counterclaim, Lloyd and Estrin said thei plication was legitimate, that they nee water to raise alfalfa for their cattle.

The ranch submitted its water applic in early 1990, just one day before Peg submitted an application of its own. Peg has since withdrawn its application.

The counterclaim contends Pegasus' posed openpit, heap leaching method "w be an unreasonable use of the sur estate . . . (and) would violate the cove of fair dealing."

Lloyd and Estrin also contend Pegasus unreasonably damaged the surface vegetation by drilling more than 1,00 ploratory holes, by constructing unreasonably extensive network of roads by illegally discharging contaminated w They asked for unspecified damages.

Terry Bauer, Ortiz project manage Pegasus, said he had not seen counterclaim and could not comment or

MIDDLE MARCH (A COCHISE

Reports on drill results in southeastern Arizona

Results of ongoing exploration drillin the Middlemarch project in southeas Arizona's Cochise County were rec reported by West Pride Industries Cor tion of Vancouver, Canada.

The operator is Toltec Resources Ltd., of Vancouver, which can earn a 60 perce terest in the property from West Pric spending (US)$2,1 million over three ye

The property is located in an old m area in Middlemarch Pass in the Dra Mountains northeast of Tombstone.

West Pride President Daniel G. Innes seven recently completed diamond drill totaled 1,113 feet from three sites on target areas.

He related that assays on core length to 39 feet in length ran from 0.02 to 0.97 cent copper, from 0.02 to 0.28 percent from 0.50 to 12.87 percent zinc and from to 0.63 ounces of silver per ton.

Innes also reported on 19 chip sar taken from one of the old underground ings that has not yet been drilled. results ranged from 0.14 to 8.46 percent from 0.01 to 9.31 percent zinc and from 0 10.10 ounces of silver per ton.

EMERALD ISLE (F) MORRAUD
JOHNSON (F) COCHISE

The Northern Miner 8/20/90

The Northern Miner U.S.

Arimetco Int'l sees bright future in low-cost SX-EW technology

Newly listed **Arimetco International** (TSE) has some ambitious plans to develop low-cost copper mines in North America which make use of acid leaching followed by solvent extraction and electrowinning, also know as SX-EW technology.

Arimetco, which recently began trading at $1.50 on The Toronto Stock Exchange, has three copper projects either at or nearing the production stage in southwestern U.S.

The first is its Yerington copper mine in Nevada, which is currently shipping cathode copper at a rate of 7,000 lb. per day. The two other projects — Johnson Camp and Emerald Isle — are in Arizona near Kingman and Tucson, respectively, and production is scheduled to begin at both by the fourth quarter of 1990.

Following the recent completion of a $7-million underwriting by Midland Walwyn, the company is aggressively pursuing the development of its low-cost copper mines which use the SX-EW technology.

Arimetco's strategy is to acquire mines with established infrastructure that allow rapid production of high-quality cathode copper through conversion to the low-cost SX-EW processing technology.

That technology allows low unit costs, estimated to be 55¢ per lb. of cathode copper. They are projected to be some of the lowest costs for the copper industry.

The majority of Arimetco's proven reserves are contained in ore that is either pre-stripped or has been mined and stockpiled.

Total recoverable pounds of copper in Arimetco's reserves are estimated at 230 million lb. for Yerington, 90 million lb. for Johnson Camp, and 20 million lb. for Emerald Isle.

Arimetco produces 99.99% pure cathode copper right at its mine site. It does so by using a leaching process where sulphuric acid is sprayed onto metal-bearing ore, which has been dumped onto plastic-lined pads. The leaching process extracts the copper in solution form (copper sulphate), and from there the copper sulphate goes to solvent extraction (SX) and electrowinning (EW) plants.

According to Midland Walwyn Research, Arimetco has capitalized on the slowness of other larger mining companies to act in purchasing copper properties, as well as on the declining mining costs for copper oxide ores.

For the past 10 years or more, a quiet revolution has been rippling through the copper industry worldwide, says Walwyn. The revolution involves the low-cost extraction of copper from large-tonnage low-grade deposits.

In place of conventional milling, shipping concentrate to a smelter and refining, the new SX-EW process uses solvent extraction. Production costs can be as low as 30¢ per lb. of copper in the case of **Phelps Dodge** (NYSE), for example.

Another recently listed company that plans to acquire low-cost copper projects in the southwestern U.S. is Toronto-based **Great Lakes Minerals** (TSE).

Nicholas Tintor, president of Great Lakes, says there is a bright future for low-cost copper mining projects which make use of solvent extraction and electrowinning technology, or SX-EW for short.

"When I tell investors about SX-EW, a lot of them really aren't very familiar with it," says Tintor. "The technology is quite similar to the type of process used at open pit, heap leach gold mines."

The heap leach technology has been successfully applied to oxide gold deposits throughout the western U.S. "The advantage with the SX-EW system is that there are no smelter charges," says Tintor, who is negotiating to acquire an interest in some copper projects in Arizona which would be amenable to SX-EW methods.

Great Lakes' first acquisition this year was an option to earn a 50% interest in a copper-sulphide project on the Keweenaw peninsula in northern Michigan.

Asarco building SX-EW plant

At a capital cost of US$54 million, **Asarco** (NYSE) says it plans to build a new solvent extraction-electrowinning (SX-EW) plant at its Silver Bell mine in Arizona.

The new facility, which should be completed by 1993, will be capable of producing 18,000 tons of copper cathode every year.

President Richard Osborne said Asarco decided to build the plant to "take advantage of the existing 58 million tons of oxide ore reserves at Silver Bell and about 22 million tons of new reserves acquired near Silver Bell in 1989."

Electrowinning, which replaces techniques, is growing increasingly popular among copper producers. In fact, a new study by the *Commodities Research Unit* estimates that electrowinning will account for about 20% of total refined copper production by the year 2000.

Silver Bell was opened in 1952 as Asarco's first domestic open pit copper sulphide mine. Although it closed briefly in 1984 because of high operating costs, the mine now produces about 5,000 tons of copper precipitates every year.

Asarco has also committed an extra US$26 million for expansion at the Ray mine at Hayden, Ariz., including $16 million for additional

Battle Mountain earnings slide

VANCOUVER — Earnings slid for **Battle Mountain Gold** (NYSE) in the first half of 1990, dropping to US$13.7 million from US$19 million for the first six months of 1989.

Johnson (F) Cochise - Emerald Isle (F) Mohave K Texas

Tucson company says its high-tech process can breathe new life into old copper mines

By Richard Ducote
The Arizona Daily Star

8/29/89

A new Tucson company plans to bring new life to three old mines by applying high technology methods that yield low-cost copper.

Arimetco Inc. acquired two Arizona mines and one in Nevada that it hopes by next year will produce a combined 91,000 pounds of high-grade copper a day.

H. Roy Shipes, a veteran copper mining executive, said the new company may be the first to try to develop several small copper mines using solvent extraction-electrowinning techniques that produce nearly pure copper at relatively low cost.

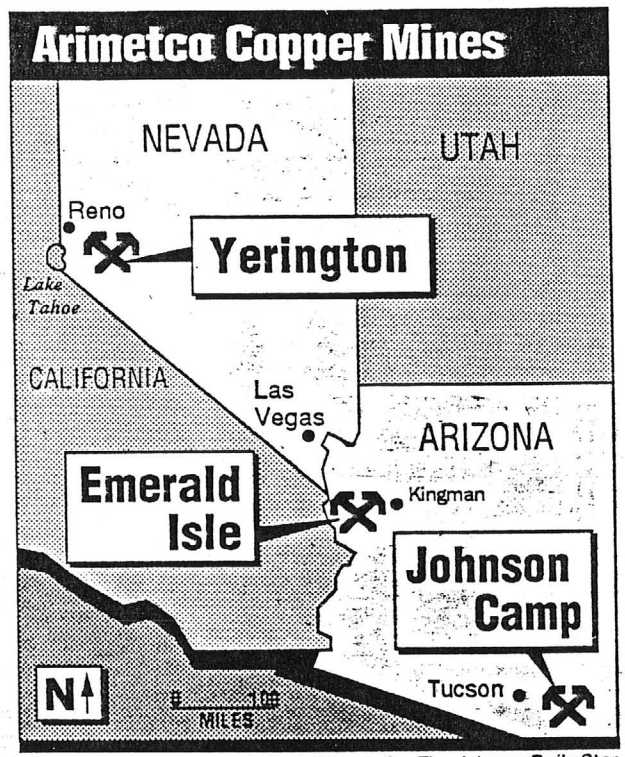
The process, known as SX/EW in copper industry shorthand, extracts copper by acid-leaching ore and then running the slightly acidic water through a processing plant that yields thick sheets of nearly pure copper that can go directly to customers, bypassing traditional concentrating and smelting methods.

Arimetco plans to resume production at the Johnson Camp mine, in the Texas Canyon area northeast of Benson, early next year. The property was previously operated by Cyprus Minerals Co. An Arimetco affiliate company will soon start building the SX/EW plant. The company anticipates production will start producing 25,000 pounds of copper a day by early next year.

Employment at Johnson Camp will total about 35 people at full production, Shipes estimated.

The Emerald Isle mine near Kingman is currently producing copper precipitate, a material that must be smelted. Arimetco plans to convert production to SX/EW later this year to produce 6,000 pounds a day.

The company's largest operation is the Yerington mine in Nevada, acquired from the former Anaconda subsidiary of Arco Inc. An SX/EW plant in place at that mine is producing 25,000 pounds of copper a day. That will be expanded to 60,000 pounds a day by early next year, Shipes said.



Judy Margolis, The Arizona Daily Star

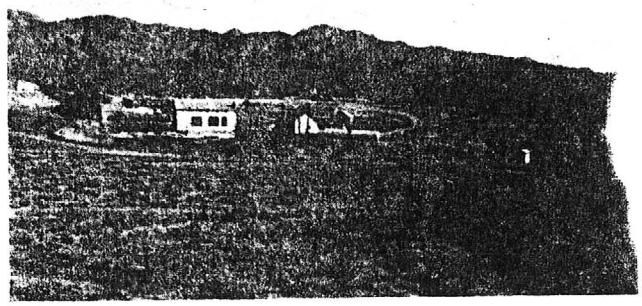
The projected average "break-even" production cost for the company's copper operation is between 55 cents and 60 cents a pound, less than half the current Commodity Exchange spot price of $1.36.

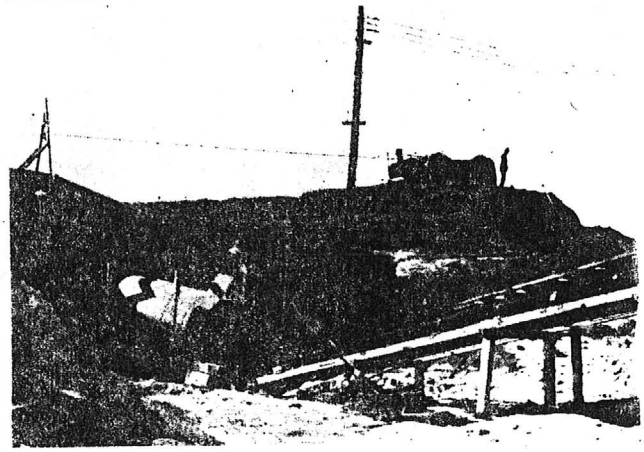
The privately-held company currently has about 45 employees. Shipes said he hopes to make a public stock offering through a Canadian stock exchange late this year to raise about $10 million in development capital.

MINING WORLD
Sept. 1944

Emerald Isle's Leaching Plant

One million tons of copper oxide ore available to Arizona's Mohave County operation





View of the Emerald Isle leaching plant with the cylindrical precipitating unit to the left. Below—The "dry scrubber" in which copper oxide is broken free from the waste.

CONVERSION from underground to open pit mining and the construction of a 300-ton leaching plant, are now virtually completed at the Emerald Isle mine, the only copper producing property in the Wallapai Mining District, Mohave County, Arizona. About 1 million tons of copper oxide ore will be leached and the values recovered by precipitation as cement copper. Ogden C. Chase, Valley National Bank Building, Tucson, is president of the company. In charge at the operation are Cy Weeks, construction engineer; Fred C. Goodale, superintendent; Joe Goodale, master mechanic; and Orlo Clawell, office manager.

Emerald Isle is an old mine with a record of considerable past production. Since October, 1943, the present company has been conducting underground operations on a high grade strip of ore along the contact through a 100′ vertical shaft which apparently bottoms the deposit. This work is still proceeding under contract with crude ore being shipped direct to the smelter.

The decision to expand operations and convert to open pit mining was based upon results of an extensive exploratory program, consisting of test pits and drilling, which revealed a reported million tons of material that will average 2 percent copper. The values occur as copper oxide in soft streaks in and encrustations on the hard gangue material. Its maximum depth is about 100′, the removal of 1 to 10′ of overburden being necessary. This was accomplished with a 60-hp. Holt Butane powered track type tractor.

Fred C. Goodale, superintendent in charge of construction at Emerald Isle.

At the time of MINING WORLD'S visit, the operation was still in the conversion and construction stage and complete data on the equipment to be used was not then available. However, plans called for mining with a stationary Lidgerwood scraper hoist equipped with a 1¼-yd. bucket. It was planned to drill vertical holes on 4′ centers to a depth of 16′ with jackhammers. Starter bits will be 2½″ graduating down to 2″ at the bottom. Plans called for loading with Trojan 60 percent bag powder to be fired with electric blasting caps, 100 holes or more at each blast.

The broken ore will be hauled by the scraper hoist through a grizzly to a 16″ steel cone shaped hopper of 25 tons capacity. A pan feeder will deliver the material to a "dry scrubber" which will remove the copper minerals from the waste. This "scrubber" is a 2-section revolving drum, the first section of which resembles a long rod mill. The inside of both sections is fitted with lifters made of 90-lb. railroad rail. No rods, balls or other grinding media is used. The impact of the ore being tumbled in the drums is believed sufficient to free the soft copper bearing material. The second section of the "scrubber" has a smaller drum inside the outer shell. This inner drum has ½″ perforations and is like a trommel screen in appearance. Ore will pass through the holes to a conveyor belt while the waste will discharge to a second conveyor. Ore will be conveyed to a bin for trucking to the leaching tanks while the product from the other conveyor will be hauled to waste piles by a scraper hoist. Until the leaching plant was completed, mining was to be conducted regularly, with the undersize from the "scrubber" being shipped to the smelter.

The leaching and wash tanks are of concrete construction with creosote treated wood launders. The plant will consist of four 300-ton leaching tanks. These will be 10 by 110′ and vary from 6 to 7′ in depth. Two of the five wash tanks will be 10 by 50′ and the others 10 by 30′. Four 300 gpm. brass Pacific pumps powered by 5-hp. direct drive motors will handle the circulation of leaching acid.

Leaching will require four days and tentative plans call for using a 1 percent sulphuric acid solution and giving four washes, one full strength, one intermediate, another full strength and one clear. The company may in the future install an acid plant to make sulphuric acid from local sulphide ores, but for the present it will be purchased in tank car lots.

Only about 65 gpm. of water wil be available for both milling and domestic use. Of this 15 gpm. will be

pumped 2 miles from Mineral Park and the balance will be pumped a distance of 2½ miles from Lyon Kay wells. For this reason, the common practice of running pregnant liquor over iron in open tanks to effect a precipitation of "cement" copper will not be used. Instead, a counter current precipitator has been installed.

The precipitator is a wooden drum 5′ in diameter and 50′ long, set horizontally and revolved at the rate of 1 rpm. The drum is made up of two shells, the inner one about 6″ smaller in diameter than the outer. They are held together by a wooden spiral between them which forms a continuous screw and makes the two shells one solid unit. The inner drum is perforated with ¼″ holes. Iron, in the form of cans, is introduced at one end and the pregnant solution at the other. "Cement" copper is precipitated and passes through the perforations into the space between the two shells. The revolving of the drum causes the spiral to act as a screw conveyor which discharges the copper precipitate to a dewatering drag. The drag deposits the final product, which will average about 90 percent copper, on a cement floor where it is sacked for shipment.

About half of the barren solution from the precipitator will be settled and the water reclaimed for further use.

Yuba Cons. Reports Income

For the fiscal year ending Feb. 29, Yuba Consolidated Gold Fields, Ltd., reported a net income of $258,014 after depletion, federal taxes, depreciation and minority interests. This is equal to 16 cents a share on the 2,300,000 shares of stock outstanding and compares with a net income of 27 cents a share in 1942. The decrease is due to the fact that the concern has been allowed to operate only two of its seven dredges while in 1942, it operated all seven for seven months prior to the gold closing order in October.

Pomona Pump Offices Moved To Hendy Headquarters

Administrative offices of Pomona Pump Division of Joshua Hendy Iron Works have been moved to Sunnyvale, Calif., for a consolidation with the general administration of the company.

Affected by the change are the sales, engineering, purchasing and accounting departments. All manufacturing activities continue in the Southern California plants at Pomona and Torrance, with Charles L. Barrett as plant manager for both.

Arthur Crago Receives Appointment In Florida

Recent announcement has been made by American Cyanamid Company of the appointment of Arthur Crago as manager of its phosphate rock production operations in Florida. Headquarters will be at Brewster.

Mr. Crago is a member of the Mining and Metallurgical Society of America and of the American Institute of Mining and Metallurgical Engineers.

Western States Conference

(Continued from Page 33)

Government ownership to private owr ship and operation for all present G ernment-owned "war plants," but only a sound economic basis; and that process or changeover be done in suc way and at such a time as not to inter with national security.

We urge that before a plant is down or its production curtailed prio ultimate sale or disposal, due consid tion should be given, insofar as possi to the overall economics of such char that such change be made, when possi only after a thorough-going survey competent disinterested, nonsectional, r political engineers and specialists.

We favor the outright sales of such plants to private industry whenever t can be made in harmony with pu welfare. Plants and equipment of pot tial postwar value which may be fo to be unsalable in the immediate post period, except at sacrifice prices, sho be leased for private operation until e nomic conditions governing their ultim actual value can be determined. Lea should be made with the objective of p ting the facilities into useful operat and as a means of testing the market the product. Leasing policies may also employed to keep in working condit those plants which may be needed future military programs.

Continue Chrome Shipments From Oxford Property

Shipments of chrome concentra and some highgrade ore are be made from the Oxford mine, Dowr ville, Calif. Development of promis chromite deposits in the adjac Gold Bluff property are being plored.

Both mines are controlled by C. Best of San Leandro, former trac magnate. A power line to the Oxf has recently been completed and t concentrator has been electrified.

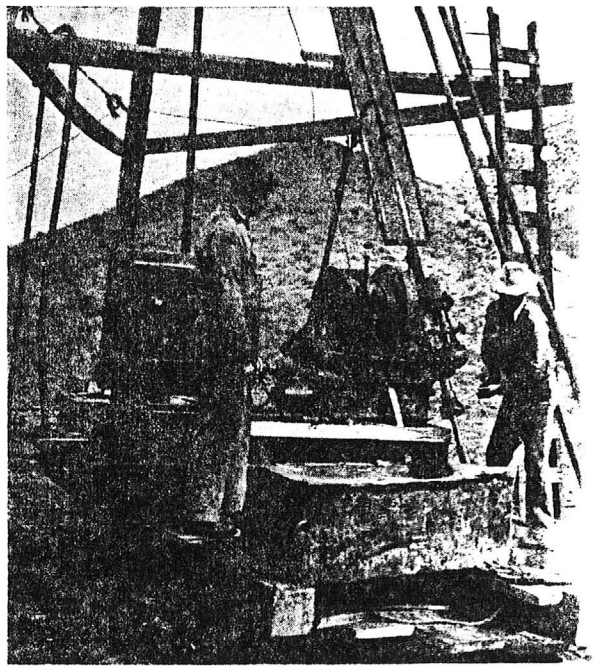
Exploration Work Progressing At A S & R's Irene Property

AN EXTENSIVE program of exploration including diamond drilling is being conducted by the American Smelting & Refining Company at the Irene Mine 6 miles north of Globe, Arizona. The project is under the direction of W. H. Loerpabel, manager of the company's southwest mining department; Abel Amis is the engineer in charge at the property.

A contract has been let to the Sullivan Machinery Company for a considerable footage of diamond drilling. The initial program called for sinking four holes which would cut the vein at considerable depth below the present workings. The work is being handled with a Sullivan No. 22 heavy duty diamond drill powered by a 4-cylinder Hercules gasoline engine. Drilling is conducted on two shifts daily.

The Irene, one of the few promising zinc showings in the area, has been the subject of considerable exploration and development work. The vein has a general east-west strike and an exceedingly strong outcrop visible for over 1000′. It is opened by a tunnel driven south to the vein with drifts at right angles, both east and west, along the ore. A station was cut and a winze sunk on the ore adjacent to the adit.

In 1943, government agencies became interested in the Irene and drilled three diamond drill holes. F sults of their findings have not be made public. Early this year so drilling work was conducted by t American Zinc, Lead and Smelti Company, who later gave up their o tion. Control was then secured AS&R, and the present program w inaugurated on April 10.



E. W. Nix and J. L. Howell of the Sullivan Machinery Co. conduct prospecting at the Irene mine with a Sullivan No. 22 heavy duty diamond drill powered by a Hercules 4-cylinder gasoline engine.

EMERALD ISLE

Cu

Mohave 8 - T 23 N, R 18 W

C. F. Weeks, Kingman '45

NAME OF MINE: EMERALD ISLE

COUNTY: MOHAVE
DISTRICT:
METALS: CU

OPERATOR AND ADDRESS: DATE:		MINE STATUS DATE:	
5/1/44	F.C.Goodale,Box 470-Kingman	5/1/44	Shipping &
		6/44	Building leaching plant
		11/44	Acid Leaching Plant finished
		2/45	Producing
		7/45	Rehabilitating leaching plant; shipping.
		1/46	Shipping & leaching cu.
6/46	Chloride Mining Co., J. R. Paine, Supt., Kingman	6/46	" "
		9/46	Idle temporarily

Mohave Miner, Mar. 1944

Mohave Miner Mar. 1944

Leaching Plant At Emerald Ise Nearly Ready

Carload Copper Ore Now Going to Smelter Daily

Of great importance to Mohave county's production of critical minerals urgently needed for America's war effort is the near completion of a new leaching plant at the Emerald Isle mine, which has been under construction since early in November.

It has been said that the virtue of consistency was quite highly developed in the person who named the Emerald Isle mining property. The green or blue-green enamel-like appearance of the copper ore would attract attention by its beauty, not to mention its mineral values, and, according to Fred C. Goodale, superintendent of the construction, the person who named it must have been an Irishman, as it certainly is "a wearin' of the green".

Picturesquely located with Sherum peak, snow-capped at the moment, rising in the background and the vast panoramic view of Sacramento valley unfurled in the foreground, Emerald Isle lies about 17 miles north of Kingman and about three miles south of Chloride, well out from the last hills along the western edge of the Cerbat range. The estate comprises eight claims situated in a compact body and is controlled by a company headed by Ogden C. Chase of Tucson, president; Cy Weeks of Kingman, consulting engineer; Fred C. Goodale, superintendent of construction, and O. C. Clewell, office manager.

Two shafts 100 feet deep have been sunk on the property and around 1,600 feet of lateral workings in drifts and crosscuts. Work is now being carried on at a place about 50 feet in the northerly direction from the bottom of one of the shafts. The ore body at this place is about 10 feet wide and runs around 7 percent. A car-

(Continued on Last Page)

load a day is being shipped regularly to the Phelps Dodge smelter at Clarkdale. The shipments will be increased to two carloads a day as soon as the enlargement of the ore bins can be completed.

There is an open pit where 50,000 tons of ore have been taken out in the past by old timers and previous operators. From this pit will be taken the low grade ore which runs around 2 percent. This ore will be pulled out of the pit by a Sauerman 2-drum hoist and run through a screening plant where the ore will be separated from the waste, then conveyed on belts to the ore bins. This ore will also be shipped to the smelter until the leaching plant is finished.

Wooden frames are being built for four enormous concrete vats 110 feet in length by 10 feet in width. The concrete will be poured as soon as the weather permits. These vats will be filled with sulphuric acid into which the ores will be conveyed after leaving the crusher. This solution will then pass from the vats to the precipitator which will recover the copper concentrates. These concentrates are expected to be about 90 percent pure. At the start, the management expects to run 300 tons per day through the plant.

All materials in the leaching plant which come in contact with the ores are acid-proof even to the nails used in the construction of vats and tanks are made of copper. Pipes now on the ground ready for installation in the classifier are necessarily made of wood. Acid for the plant will be brought in when operations start, but later, it is the company's plan to have a plant for making its own acid.

Compressor and transformer shelters are now being erected and the finishing touches to the electric power system, which will furnish power and light for underground mining as well as top operations are being made by the Citizens Utilities company of Kingman.

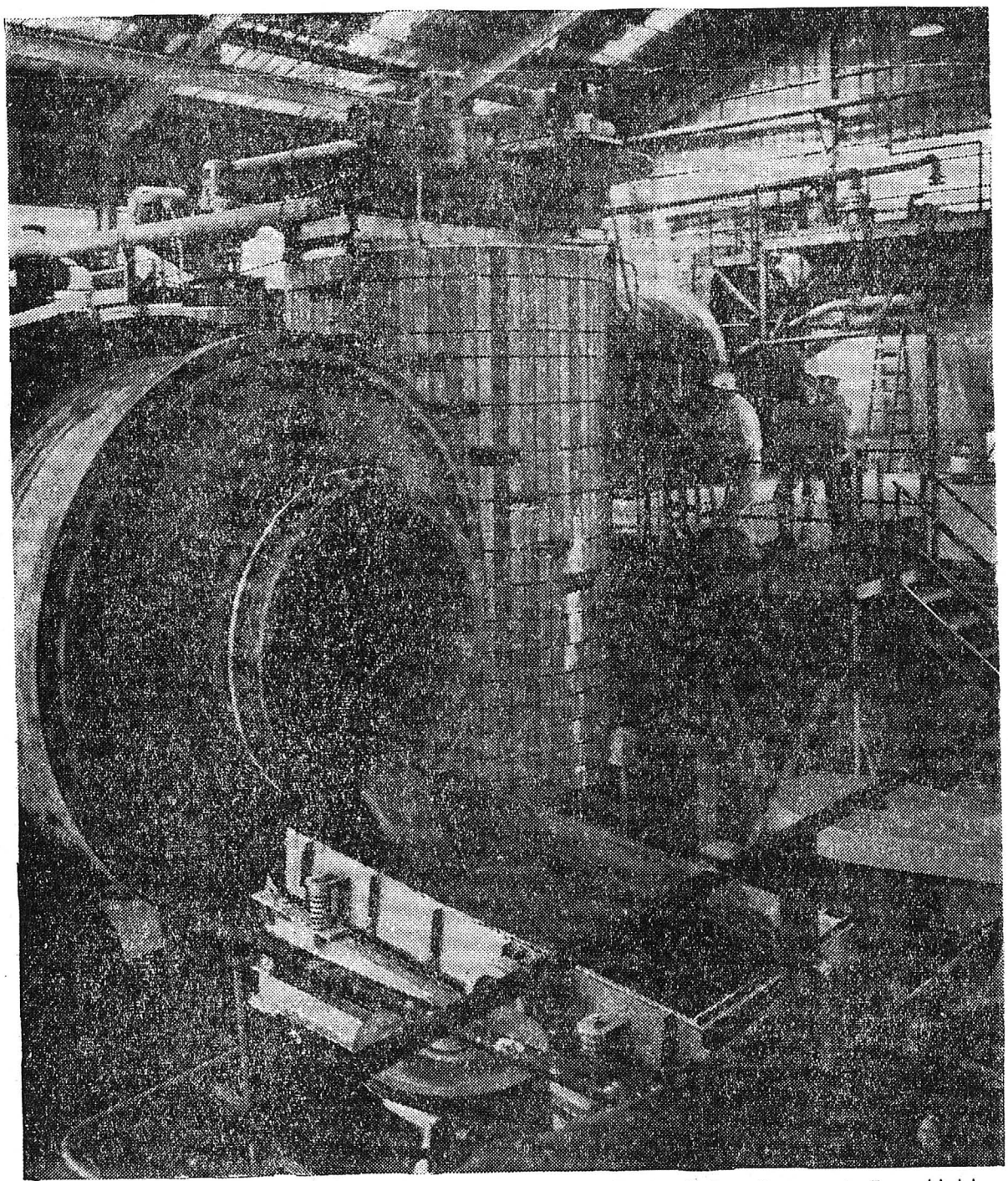
The Emerald Isle mine boasts of one of the largest water storage tanks in the county. It has a capacity of 320,000 gallons. Water for mine uses is piped from Mineral Park and for domestic use a pipe line, now nearing completion, is being laid from the property to a spring at the Kay mine two miles to the south. On the property also is a powder magazine which will hold a carload of explosives. There is a good-sized cook house, a bunk house, office building and a number of dwellings on the premises.

The Emerald Isle ore carries no other metal besides copper, and according to Goodale, the mine is no longer a promotion deal as it is paying its own way.

Twenty-five men, including carpenters, electricians, welders, etc., and two underground shifts are working steadily. Mining in contracted by Blackie McGovern and the Parker brothers, and C. R. Maddux is contracting the hauling.

El Paso's Emerald Isle Copper Operation Began In Year 1967

Jan 1968



PRECIPITATING DRUM, EMERALD ISLE MILL — El Paso Natural Gas Company's Emerald Isle mill employs a leaching-precipitation-flotation process to produce a medium grade copper concentrate from one percent oxide copper ore. Photo shows precipitation drum, with leaching tank behind it.

Mohave County Miner
Jan. 1968
cont next page.

Cont. from Prior
from El Paso's
Emerald Isle Copper
operation Began in
year 1967.

EL PASO — Construction of El Paso Natural Gas Company's mill at its Emerald Isle copper mine near Chloride, Arizona, was completed in the fall of 1967, and the mill began processing ore during the latter part of the year.

The mine and mill comprise one of two relatively small copper properties that the Company has in Arizona. The other is its Lakeshore mine and mill near Casa Grande.

The Emerald Isle operation is located about 15 road miles northwest of Kingman and about three miles south of Chloride. Les Mead of Kingman is superintendent. He has under his direction about 35 employees.

The mill has a capacity of 800 to 850 tons of ore daily. The ore body is estimated to contain about one and a half million tons of ore. Approximately one and a half million tons of overburden have been removed to expose the ore for mining by the open pit method.

The mill employs a leaching-precipitation-flotation process to produce medium grade copper concentrate from one percent oxide copper ore.

The ore is first ground to a small size at the mine, in a two-stage crushing system. It then goes to storage bins at the mill. From storage, the ore is fed into a rod mill and ground fine. It then goes through a series of leaching tanks, then to a precipitating drum, and finally into a flotation circuit where the copper is recovered.

Jan 1968.

El Paso Natural Gas Company is reported getting encouraging results from a small in-situ copper leaching experiment at its Emerald Isle mine in Mohave County.

PAY DIRT for May 27, 1974

May Leach Emerald Isle

After several years of mixed results, El Paso Mining and Milling Company, a wholly-owned subsidiary of The El Paso Company, is conducting a study jointly with the U.S. Bureau of Mines to determine feasibility of resuming production at the Emerald Isle copper mine near Kingman as an insitu leaching operation.

During 1974, two blasts were set off at Emerald Isle with technical assistance of the Twin Cities Mining Research Center of the U.S. Bureau of Mines.

The first blast was set off in February in ore, which presently is being leached. In August, the second blast was set off beneath 200 feet of overburden, with leaching scheduled to commence early this year.

If these tests are successful, commercial production is planned.

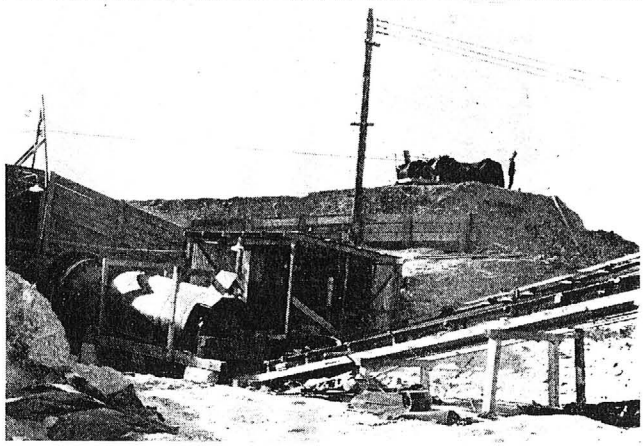
The Emerald Isle was closed late in 1973 following operation for six years by the leach-precipitation-flotation method. The property had been acquired by the company in 1965. It is located 17 miles north of Kingman near the Mineral Park copper-molybdenum mine operated by Duval Corporation. Lester Mead serves as mine superintendent for El Paso at Emerald Isle.

PAY DIRT for January 27, 1975

Sept. 1944

Emerald Isle's Leaching Plant

One million tons of copper oxide ore available to Arizona's Mohave County operation



View of the Emerald Isle leaching plant with the cylindrical precipitating unit to the left. Below—The "dry scrubber" in which copper oxide is broken free from the waste.

CONVERSION from underground to open pit mining and the construction of a 300-ton leaching plant, are now virtually completed at the Emerald Isle mine, the only copper producing property in the Wallapai Mining District, Mohave County, Arizona. About 1 million tons of copper oxide ore will be leached and the values recovered by precipitation as cement copper. Ogden C. Chase, Valley National Bank Building, Tucson, is president of the company. In charge at the operation are Cy Weeks, construction engineer; Fred C. Goodale, superintendent; Joe Goodale, master mechanic; and Orlo Clawell, office manager.

Emerald Isle is an old mine with a record of considerable past production. Since October, 1943, the present company has been conducting underground operations on a high grade strip of ore along the contact through a 100′ vertical shaft which apparently bottoms the deposit. This work is still proceeding under contract with crude ore being shipped direct to the smelter.

The decision to expand operations and convert to open pit mining was based upon results of an extensive exploratory program, consisting of test pits and drilling, which revealed a reported million tons of material that will average 2 percent copper. The values occur as copper oxide in soft streaks in and encrustations on the hard gangue material. Its maximum depth is about 100′, the removal of 1 to 10′ of overburden being necessary. This was accomplished with a 60-hp. Holt Butane powered track type tractor.

Fred C. Goodale, superintendent in charge of construction at Emerald Isle.

At the time of MINING WORLD'S visit, the operation was still in the conversion and construction stage and complete data on the equipment to be used was not then available. However, plans called for mining with a stationary Lidgerwood scraper hoist equipped with a 1¼-yd. bucket. It was planned to drill vertical holes on 4′ centers to a depth of 16′ with jackhammers. Starter bits will be 2½″ graduating down to 2″ at the bottom. Plans called for loading with Trojan 60 percent bag powder to be fired with electric blasting caps, 100 holes or more at each blast.

The broken ore will be hauled by the scraper hoist through a grizzly to a 16″ steel cone shaped hopper of 25 tons capacity. A pan feeder will deliver the material to a "dry scrubber" which will remove the copper minerals from the waste. This "scrubber" is a 2-section revolving drum, the first section of which resembles a long rod mill. The inside of both sections is fitted with lifters made of 90-lb. railroad rail. No rods, balls or other grinding media is used. The impact of the ore being tumbled in the drums is believed sufficient to free the soft copper bearing material. The second section of the "scrubber" has a smaller drum inside the outer shell. This inner drum has ½″ perforations and is like a trommel screen in appearance. Ore will pass through the holes to a conveyor belt while the waste will discharge to a second conveyor. Ore will be conveyed to a bin for trucking to the leaching tanks while the product from the other conveyor will be hauled to waste piles by a scraper hoist. Until the leaching plant was completed, mining was to be conducted regularly, with the undersize from the "scrubber" being shipped to the smelter.

The leaching and wash tanks are of concrete construction with creosote treated wood launders. The plant will consist of four 300-ton leaching tanks. These will be 10 by 110′ and vary from 6 to 7′ in depth. Two of the five wash tanks will be 10 by 50′ and the others 10 by 30′. Four 300 gpm. brass Pacific pumps powered by 5-hp. direct drive motors will handle the circulation of leaching acid.

Leaching will require four days and tentative plans call for using a 1 percent sulphuric acid solution and giving four washes, one full strength, one intermediate, another full strength and one clear. The company may in the future install an acid plant to make sulphuric acid from local sulphide ores, but for the present it will be purchased in tank car lots.

Only about 65 gpm. of water will be available for both milling and domestic use. Of this 15 gpm. will be

pumped 2 miles from Mineral Park and the balance will be pumped a distance of 2½ miles from Lyon Kay wells. For this reason, the common practice of running pregnant liquor over iron in open tanks to effect a precipitation of "cement" copper will not be used. Instead, a counter current precipitator has been installed.

The precipitator is a wooden drum 5′ in diameter and 50′ long, set horizontally and revolved at the rate of 1 rpm. The drum is made up of two shells, the inner one about 6″ smaller in diameter than the outer. They are held together by a wooden spiral between them which forms a continuous screw and makes the two shells one solid unit. The inner drum is perforated with ¼″ holes. Iron, in the form of cans, is introduced at one end and the pregnant solution at the other. "Cement" copper is precipitated and passes through the perforations into the space between the two shells. The revolving of the drum causes the spiral to act as a screw conveyor which discharges the copper precipitate to a dewatering drag. The drag deposits the final product, which will average about 90 percent copper, on a cement floor where it is sacked for shipment.

About half of the barren solution from the precipitator will be settled and the water reclaimed for further use.

Yuba Cons. Reports Income

For the fiscal year ending Feb. 29, Yuba Consolidated Gold Fields, Ltd.,

A REPUBLIC

November 26, 1966

El Paso Firm Will Also Mine

By BILL NIXON
Northern Arizona Bureau

KINGMAN — Plans to build and operate a near-million-dollar copper mine and mill in this area were confirmed last night by the El Paso Natural Gas Co.

The Sundt Construction Co. of Tucson is now removing 1.5 million cubic yards of overburden to make way for the open pit mine and mill, described by an El Paso spokesman as a "relatively small cooper operation."

News of the development came on the heels of announcement earlier this week that a $10 million copper rod and wire manufacturing plant will be built here by a national cable company.

The two projects, however, are unrelated, according to the El Paso firm.

The El Paso spokesman said total cost of the mine-mill complex will be "something less than $1 million."

THE SITE is approximately 15 miles northwest of here and within 3 miles of the Duval Corp.'s copper mine and mill installation.

S.M. Runke, chief metallurgist for the gas company, told The Arizona Republic by telephone from his Texas home that the new plant will be in full production by mid-1967. It will be automated and capable of processing 800 tons of copper ore per day, he said.

Runke said 35 to 40 men will be employed to operate the complex.

El Paso said it has a working partner in the Kingman operation, but the name of the firm and the extent of its interest were not revealed.

The new construction site is on the old Emerald Isle mining claim property formerly owned by C. G. Patterson of Chloride. El Paso was reported to have purchased a 560-acre claim from Patterson for an undisclosed price. The firm also is said to have purchased 60 other mining

(Continued on Page 1, Col. 8)

More About

New Plant

(Continued from Page 1)

claims adjacent to the Patterson property.

Five days ago it was announced that the General Cable Corp. of New York will build a multimillion - dollar copper rod and wire plant at Kingman Airport Industrial Park, to have an annual payroll of $1 million.

ALTHOUGH El Paso said there was no connection between its mine - mill and General Cable's manufacturing plant, the latter firm plans production shortly after the new mining venture is under way.

Until three years ago, Kingman was principally a U.S. 66 tourist stop for motorists heading for Las Vegas, Southern California and Lake Mead. In 1962 the city's population was 3,700. It rose to 7,500 in 1965, and estimates now place it at near 9,000.

The burgeoning population is credited mainly to the Duval Corp.'s copper mining operation. Duval employs approximately 400 men.

JOHNSON (F), EMERALD ISLE (F), ZONIA (F), VAN DYKE (F), WHITE CLIFF (F)

QUERY

Perron, Arimetco have faint pulse

AJ Perron and Arimetco International have both been de-listed. Is there any hope for either of them?

Fred Carach, Miami, Fla.

Arimetco International (ARX-T) was de-listed by the Toronto Stock Exchange on June 12, 1998, after a year under suspension. The TSE had suspended trading in the shares and the Ontario Securities Commission (OSC) had issued a cease-trade order when the company failed to file financial statements for the year ended Dec. 31, 1996.

Arimetco International's U.S. subsidiary, Arimetco Inc., had filed for protection under the U.S. Bankruptcy Code at the end of May 1997. The U.S. courts allowed the company to present a plan of reorganization to its creditors and shareholders, who approved it in a mail-in ballot.

There were objections to the plan of reorganization, which the court is now hearing. Because the court must approve of the final plan, the company's situation is still unclear.

Susan Boswell, lead counsel for Arimetco, tells *The Northern Miner* that shareholders might have a chance of receiving something after the creditors are paid, but that will depend on the prices Arimetco can get for its existing assets. "This plan calls for the sale of properties over a very extended period," she says, "so there are so many factors. If the market takes off again, there may be [shareholder compensation]; if it doesn't, there won't be."

AJ Perron Gold (AJP-T) has been under a cease-trade order from the OSC since Dec. 20, 1996, and was de-listed by the TSE on Jan. 20, 1998. Its surface assets at the Kerr mine in Virginiatown, Ont., were seized by the local municipality, McGarry Twp., in October 1996 for back property and business taxes that the township said the company owed.

The company applied for a court order to prevent the auction, and, that failing, filed a statement of claim against the township. The township then filed a statement of defence, and says it has heard nothing more from the company.

To the best of our knowledge, the company has not applied for protection from creditors, though it remains delinquent in its filings in Ontario. In the meantime, it is being managed from Perron Corporate Services, 1595 Griffiths Place, Kelowna, B.C. V1Z 2T7. Phone: (250) 769-6080. Fax: (250) 769-6011.

BRX (F)

MERGER CONFIRMED

Regulators question Golden Eagle find

Trading in **Golden Eagle International** has been suspended by the U.S. Securities and Exchange Commission amid controversy surrounding the company's claims that it has discovered a large gold deposit in Bolivia.

The SEC cited concerns over the "accuracy and adequacy" of assertions by Golden Eagle that it had identified a proven reserve of 6.4 million oz. on its 2,000-ha Cangalli concession. The company had also stated that the property hosts an inferred resource of 157 million oz. and an indicated resource of 78.7 million.

However, disclosures by the Denver-based company give no indication that a feasibility study was ever conducted on the property; nor has Golden Eagle issued a grade or tonnage calculation for the alleged deposit — only a bulk amount of gold. The resource estimate is based on 107 samples taken from trenches, road cuts, pits and old workings.

The claims appeared just weeks after civil stock fraud charges were leveled against the company by the SEC, which is conducting an investigation into whether or not Golden Eagle issued misleading statements and made false regulatory filings between 1994 and 1996. Said an SEC official when the investigation was launched in early May: "It's what we call a hype-and-dump. They issue false press releases, get the market excited and sell a lot of stock."

Shares traded as high as US$6.25 in mid-1994 before tumbling to 32¢ prior to the halt; which is in effect until July 6. The SEC alleges that the defendants, including former president Ronald Knittle and his that principals of the company are dumping overvalued stock. "Everyone we're talking to is in this for the long haul," he said in a recent interview with a Denver-area newspaper.

Also, Golden Eagle has failed to file its 1997 and first-quarter 1998 financial statements with the SEC. Turner said the delay stems from problems concerning Bolivian and U.S. accounting standards, and added that the reports will be filed soon.

Meanwhile, another company with a controversial precious metals discovery has filed for bankruptcy protection in a Phoenix court. The company, Arizona-based **International Precious Metals** (IPM), claims to have discovered a multi-million-ounce gold-platinum-palladium deposit on its Blackrock property in the Arizona desert.

Related to the filing was the sale by **MG Gold** (MGAU-O) of 620,000 of its shares owned by IPM. The shares were bought by a private investment group.

Payment deferred

Olympus Pacific Minerals (OYM-V) has inked a deal with **Indochina**

Inves

Analysts a

Mining analyst Ge
Deacon Capital is
eye on results fr
programs being
Birim Goldfields
joint-venture part
West Africa.

The analyst is pa
ed in the Dunkwa
ated by Birim's part
tain Gold (BMG-N
owned Bui gold p
by **Newmont Go**
property is 40 km
Ashanti gold mine.
ed for more than 1

"The [Dunkwa
producing mines
[Ashanti] and sou
Prestea] of it, alon
and exploration wi
to date has been p
notes in a research
property is in th
exploration, but
mineralized Tarkw
ates, on which thr
Ghana have recen
an exciting target."

Birim has a th
Ghana, the 90%-
property, which h
Akrokeri mine (
While some soi
drilling have be
around the mine
years, Birim has pl
hold in order to fo
on more advanced

During the past
tle Mountain has s
lion exploring Biri
ject. The major
interest by spendi
over four years.
prospects were id

Fi
e

In April, accor
the U.S. Securi
Commission,
Freeport-McM
Gold (FCX.A-N

$3.00 Per Year — 10c Per Copy NOV. 13, 1947

Large Ore Bodies In Sight At Emerald Isle Mine, Copper Production High

St. Louis Copper Fabricator Operates Cerbat Range Property Thirty-two Men Employed On Project

Between three-quarters of a million and a million tons of copper ore are in sight for immediate mining at the Emerald Isle mine, officials of the Lewin-Mathes Mining company, operators of the property said this week. The company, which employs thirty-two men and has a milling system in full operation, mines the copper ore for use by its St. Louis, Mo., fabricating firm.

The Lewin-Mathes company is a fabricator of copper tubing and other byproducts in the midwest.

A Miner correspondent visited the site last Friday morning and was conducted over the plant by Robert Payne, superintendent. Payne is a veteran mining man in this district who makes his home in Chloride and is a member of the board of trustees of the Mohave County Union High school.

Earl Hastings is general manager here for the company.

The large open pit mine is being stripped by a yard and a half shovel which loads the ore into trucks that take it to a nearby crushing plant.

The pit is about forty feet deep and extends over several hundred yards width. The type mineral being taken from the ground is an oxidized ore.

After the ore is dumped at the crusher plant it enters an Allis-Chalmers jaw crusher. From here it continues on to a Simmons vibrating screen where the minus five-eighths inch rock is removed.

The oversize goes to the secondary Simmons cone crusher and to a second vibrating screen where the minus one-eighth ore is removed. The minus one-eighth ore is then taken to a washing classifier where the slime is removed. A large conveyor belt continually moves the ore from the lower crusher to the vibrating screens and classifier.

The plus-twenty and the minus five-eighths is then mixed in one of four large three hundred ton vats. This is the most interesting part of the entire operation.

Mohave. cont. NOV. 13, 1947

The vats are approximately 12 feet wide, eight feet deep and about seventy feet long. The bottom that the ore rests on is merely a wooden floor and under that is a chamber into which an acid solution is pumped.

The acid solution enters the chamber at the bottom of the vat under pressure and boils up thru the ore. The copper is located in the cavities of the rock and is removed by the chemical action of the acid.

After this operation is carried on for several hours, the acid solution is pumped off and the acid takes all the copper mineral with it. It is then pumped into storage tanks.

The next step in the concentration of the copper comes when the acid carrying the copper is moved again, this time into an immense cylindrical precipitator. At the same time that the acid enters the precipitator, small particles of iron are also injected into the mixture.

The chemical reaction created by the injection of the iron particles is that the acid releases the copper and forms iron sulphates. The copper, in a very wet state, comes from the precipitator and enters a filter from which it is dried.

After the copper is dried it is stored to await shipment to the headquarters of the Lewin-Mathes company in St. Louis.

One carload shipments of 80 percent concentrates are shipped to St. Louis every ten days. Four hundred tons of the open pit ore is milled every day by this operation.

The water supply for the camp is contained in a three hundred thousand gallon storage tank which is kept filled by water from the White Horse mine two miles away. Boulder dam electrical power is used.

Two large tanks contain the tremendous amounts of liquid acid used in the operation. Tanker trucks owned by the company replenish this supply weekly.

The company started operations at the Emerald Isle last April.

Most of the workers at the mine live in the Chloride area.

REFERENCES

METAL MINING & PROCESSING FEBRUARY 1965 p 38

E. & M J VOL 167 October 1966 p 139

The *Emerald Isle* copper property, near Chloride, Arizona, is being operated by C. G. Patterson of Chloride. At present, he is mining and shipping better than a carload of ore a week from the 100-foot level, and is employing a crew of 10 to 12 men. Earlier, he shipped about 3,000 tons of ore from the old dumps.

C. G. Patterson, Chloride, Arizona, is employing a small crew in heap leaching at the **Emerald Isle** mine. Currently, between 60 and 65 gpm of solution are going through the precipitating plant. A new pump is to be installed to increase production.

Metal Min + Proc. 2/1965

El Paso Natural Gas Co. has a deep-drill exploration program under way at the Emerald Isle copper-zinc mine east of Chloride.

H. W. Horst is project engineer for El Paso. Until recently, Pat Patterson, of Chloride, was conducting a leaching operation at the mine.

An extensive program of drilling for copper and zinc has been conducted at the Emerald Isle mine, between Mineral Park and Chloride, Arizona, by El Paso Natural Gas Company. H. W. Horst, Holiday House, Kingman, is project engineer directing the exploration. Until El Paso Natural Gas took over last January, Pat Patterson of Chloride was conducting a small leaching operation at the Emerald Isle. Pay Dirt 8/19/66

NEWS OF MINES AND MEN

El Paso Natural Gas Company is scheduling its development and construction operations at the Emerald Isle mine at Kingman, Arizona, for a June first production date. The company has decided to employ the leach-precipitation-flotation (L-P-F) method of recovery and set the eventual target at 1,000 tons of ore per day. Ore encountered during stripping is stockpiled in the center of the pit. Crushing—both primary and secondary—will be done in the pit and ore transported to storage tanks near the mill by conveyor. From storage the ore will go to an 8 x 12 Marcy rod mill, then to the mill circuit. S. M. Runke, chief metallurgist (mining division), is manager of the operation, assisted by Les Mead, superintendent, Homer Hale, mill superintendent, and C. F. Elwanger, maintenance and pit superintendent. Pay Dirt 4/12/67

Both mine-stripping and mill-construction are going full blast at the Emerald Isle copper mine, 15 miles northwest of Kingman, Arizona, under development by El Paso Natural Gas Company. Crushing — both primary and secondary — is to be done in the pit and ore transported to storage tanks near the mill by conveyor. This conveyor is more than half completed, and the mine and mill are expected to be in production by the middle of the year. Copper recovery will be by the leach-precipitation-flotation method with an eventual target of handling 1,000 tons of ore per day. The operation is expected to employ 35 to 40 persons regularly. C. F. Elwanger has been in charge of construction. Pay Dirt 6/1967

EMERALD ISLE NEAR KINGMAN IS STATE'S NEXT OPEN-PIT MINE

Plans for an open-pit mining operation at the old Emerald Isle mining claim, near Kingman, Arizona, have been announced by El Paso Natural Gas Company. The property is approximately 15 miles northwest of Kingman and within three miles of Duval Corporation's Mineral Park operation.

According to S. M. Runke, chief metallurgist (mining division), El Paso Gas expects the open-pit mine and mill to be a "relatively small" copper operation, costing in the $1 million range. Plans call for the new plant to be in full production by mid-1967. It will be fully automated and capable of processing from 800 to 900 tons of copper ore per day, employing 35 to 40 men.

The Sundt Construction Company of Tucson has already started the removal of overburden, a 1.5 million cubic yard project, to make way for the mine-mill complex. The first phase of the construction will be directed by C. F. Elwanger, formerly of El Paso's Tuba City, Arizona, office.

The Emerald Isle was acquired about a year ago from C. G. Patterson of Chloride, who had been conducting a small leaching operation. In addition, several adjacent claims were purchased. H. W. Horst, project engineer for the utility firm, directed the extensive program of diamond drilling which was conducted prior to the decision to place the property on a production basis.

El Paso Gas to spend $28-million on Arizona copper project

El Paso Natural Gas Co. has announced the development of an open-pit copper mine and concentrator on the Emerald Isle mining claims near Chloride, in Mohave County. El Paso purchased 560 acres of mineral land from C. G. Patterson of Chloride, former operator of the Emerald Isle.

S. M. Runke, chief metallurgist for the firm, said the copper mine and plant would be in operation by the fall of 1967. C. F. Elwanger will be transferred from El Paso's Tuba City office to be superintendent in charge of construction. His office will be at Kingman.

The M. M. Sundt Co. of Tucson has the contract to remove 1.5-million cubic yd of overburden for the open-pit development. Sundt has a fleet of 35-yd scrapers, bulldozers and drills operating one shift a day currently on the job. Bob Husky is project foreman for Sundt.

Construction of a 900-tpd flotation plant began shortly after Jan. 1, 1967.

Emerald Isle Copper Co.
Ogden C. Chase, Pres., Gen. Mgr.
407 Valley National Bk. Bldg.
Tucson, Ariz.

C. F. Weeks, Gen. Supt., Cons. Engr.
F. C. Goodale, Mech. Engr. Empl. Agt.
Kingman, Ariz.

O. E. Clewell, Ch. Clerk., Ch. Electr.
Chloride, Ariz.

1/44 Shipping on advance premium--preparing leaching plant.

-/44 Fire in hoist room and change house halted work two days.

2/45 Producing average of 300 tons copper daily. Ore treated in leaching plant.

The **Emerald Isle Copper Company,** Ogden C. Chase, president, Boggs Building, Las Vegas, Nevada, has made application for a $450,000 RFC loan to be used in developing its property 15 miles north of Kingman, Arizona. The company now has a 300-ton heap acid leaching plant partially completed and it is planned to finish construction of this plant if the loan is approved. Further drilling also is planned for the property, which now has 650,000 tons of surface ore partly exposed, assaying 2.5 per cent copper. New housing, mining equipment, new power units, acid plant, etc., also will be provided under the proposed development program.

Mining Journal 6/30/42

Emerald Isle Copper Co.
Ogden C. Chase, Pres., Gen. Mgr.
[illegible] National Bk. Bldg.
Tucson, Ariz.

C. F. Wesche, Gen. Supt., Const. Engr.
E. C. Goodale, Mech. Engr., Empl. Agt.
Kingman, Ariz.

O. E. Clewell, Ch. Clerk, Ch. Electr.
Chloride, Ariz.

1/44 Shipping on advance premium--preparing leaching plant.

6/44 Fire in hoist room and change house halted work two days.

2/45 Producing average of 300 tons copper daily. Ore treated in leaching plant.

Mining Journal 6/30/42

The **Emerald Isle Copper Company,** Ogden C. Chase, president, Boggs Building, Las Vegas, Nevada, has made application for a $450,000 RFC loan to be used in developing its property 15 miles north of Kingman, Arizona. The company now has a 300-ton heap acid leaching plant partially completed and it is planned to finish construction of this plant if the loan is approved. Further drilling also is planned for the property, which now has 650,000 tons of surface ore partly exposed, assaying 2.5 per cent copper. New housing, mining equipment, new power units, acid plant, etc., also will be provided under the proposed development program.

control position.

Fax interest inquiry to

212-593-6148

VAN DYKE (A) GIRA
EMERALD ISLE (A) MOHAVE
ZONIA (A) YAVAPAI

ARIZONA & NEVADA COPPER MINES & NEVADA GOLD MINE BANKRUPTCY COURT AUCTION SALE

The U.S. Bankruptcy Court for the District of Arizona (Tuscon Division) will conduct a public auction sale on **Thursday, April 1, 1999, at 9:30 a.m.** of the the following mineral properties located in Arizona and Nevada, USA. The properties will be sold in its "as-is" condition to the highest and best bidder and pursuant to bankruptcy code §363 free and clear of liens, claims, encumbrances and interests.

- **Emerald Isle Mine** located 15 miles NW of Kingman, AZ. In the Wallapai mining district, consists of 9 unpatented lode claims 194 acres. 15-mill site claims 131.4 acres. The Emerald Isle mine is a copper open pit 8,000 lb per day SX-EW operation.
- **Van Dyke Mine** (Leasehold) located in Miami, AZ. In the Globe–Miami mining district, consists of 1,240 acres of patented claims, 1,480 acres of unpatented claims, minor acreage of fee claims. The Van Dyke mine is a copper selective cave underground mining operation.
- **Zonia Mine** located 6 miles SE of Kirkland Junction, AZ. In the Bagdad mining district, consists of 722 acres patented claims, 63 unpatented claims, 28 unpatented mill site claims. The Zonia mine is a open pit copper operation.
- **Yerington Mine** located in Yerington, NV located in the Yerington mining district consists of 108 unpatented lode claims, 85 patented lode claims. The Yerington mine is completely permitted and operating copper mine with 60,000 lb/day sx-ew plant. Associated with this property is the Ann Mason copper deposit and MacArthur copper property.
- **Ann Mason** copper Deposit located in Yerington, NV. Consists of 74 unpatented lode claims. Drill proven and probable reserves by Anaconda are 3.9 billion pounds contained metal.
- **MacArthur** copper property located in Yerington, NV. Is a permitted open pit copper operation. 76 unpatented lode claims; the ore is processed at the Yerington Mine sx/ew plant. The MacArthur deposit is a drill proven resource with 35 million tons @ 0.28%Cu.
- **Paradise Peak** gold property located 8 miles south of Gabbs, NV. Is a fully permitted mine with complete processing facilities 5,000 tpd CCD mill. 175 unpatented lode claims. 487 acres of patented mill sites and lode claims. Also encompasses the County Line deposit.
- **Sullivan Property** located 2 miles north of the Paradise Peak mill site. Sullivan is a combination oxidized copper gold ore body containing approximately 17 million tons of drill proven ore grading 0.34% copper and 0.0255 oz. gold per ton. Consists of 21 acres of patented land and approximately 15,900 acres of unpatented mining in Nye and Mineral counties.

For further information and bid terms and procedures contact John Mckinney at:

Arimetco, Inc.

Telephone: (520) 629-1215 • Fax: (520) 889-0729

N. MINER March 8-14, 1999

TSE Rights and Warrants

America Mi[illegible]elds — Wt buys sh @ $9.00 to Apr 26/99
BGR Precious Metals Cl A — Wt buys Cl A sh @ $25.00 to Feb 20/04.
Campbell — Wt buys sh @ US$1.50 to Feb 26/99.
CrownJoule Expl. — Wt buys sh @ $2.25 to Mar 16/99.
Franco-Nevada Mining — Wt buys 4 shs @ $200.00 to Sept 15/03.
Greenstone Resources — Wt buys sh @ $15.25 to Feb 28/02.
Inmet Mining — Wt buys sh @ $5.70 to Sept 5/00.
Itec-Mineral — Wt buys sh @ $1.38 to Sept 25/02.
McWatters Mining Wt buys sh @ $2.50 to Sept 12/99.
Nebex Resources — Wt buys sh @ $1.00 to Apr. 30/99.
Nuinsco Resources — Wt buys sh @ 42c to Dec 6/99.
T&H Resources — Wt buys sh @ 25c toApr 15/99.
Vengold — A wt buys sh @ US$2.35 to Jun 13/00.
Vengold — B wt buys sh @ US$1.30 to Jun 13/00.

Supplied by TSE

Overseas Quotes

Close: Tuesday March 2, 1999

	Volume	Close
SOUTH AFRICA (SA Rand)		
Anglovaal Mg	505,000	23.40
Avgold	99,700	2.96
Cons African	2,623,000	0.85
Gencor	543,300	14.55
Gold Fields	382,700	36.80
Iscor	2,881,100	1.11
JCI Gold	301,300	4.35
Randfontein	180,600	12.65
St. Helena Gold	0	15.50
Western Areas	91,400	17.70
AUSTRALIA (Aust.$)		
Acacia Res	903,809	2.25
Aurora Gold	87,577	0.88
Centaur Mg	2,380,436	0.35
Delta Gold	112,796	2.38
Emperor Mines	62,000	0.68
Goldfields	10,747	1.30
Kidston Gold Mines	13,200	0.44
M.I.M. Holdings	2,888,512	0.69
Newcrest Mg	829,571	2.46
Resolute	4,885,994	1.13
Sons of Gwalia	398,015	4.76

Conversion of Weights and Measures

1 troy ounce	=	31.1 grams
1 kilogram	=	32.15 troy ounces
1 kilogram	=	2.2046 pounds
1 (metric) tonne	=	1,000 kilograms
1 (metric) tonne	=	2,204.6 pounds
1 (short) ton	=	2,000 pounds
1 (metric) tonne	=	1.1023 (short) tons
1 gram per (metric) tonne	=	0.02917 troy ounces per (short) ton
	=	0.03215 troy ounces per (metric) tonne
1 kilometre	=	0.6214 miles
1 hectare	=	2.47 acres

Chromium: Recent physical tra per tonne (Mar. 2/99).
Cobalt: Recent physical trades lb. (Mar. 2/99).
Copper: Comex March deliver (Mar. 2/99).
Indium: Indium Corp., ingot, U 2/99).
Iridium: Representative mid-mar (Mar. 2/99).
Magnesium: Producer ingot US 2/99).
Manganese: Representative mi per tonne (Mar. 2/99).
Molybdenum: Recent physical tr per lb. molybdenum in oxide (Ma
Niobium: Composite spot ore

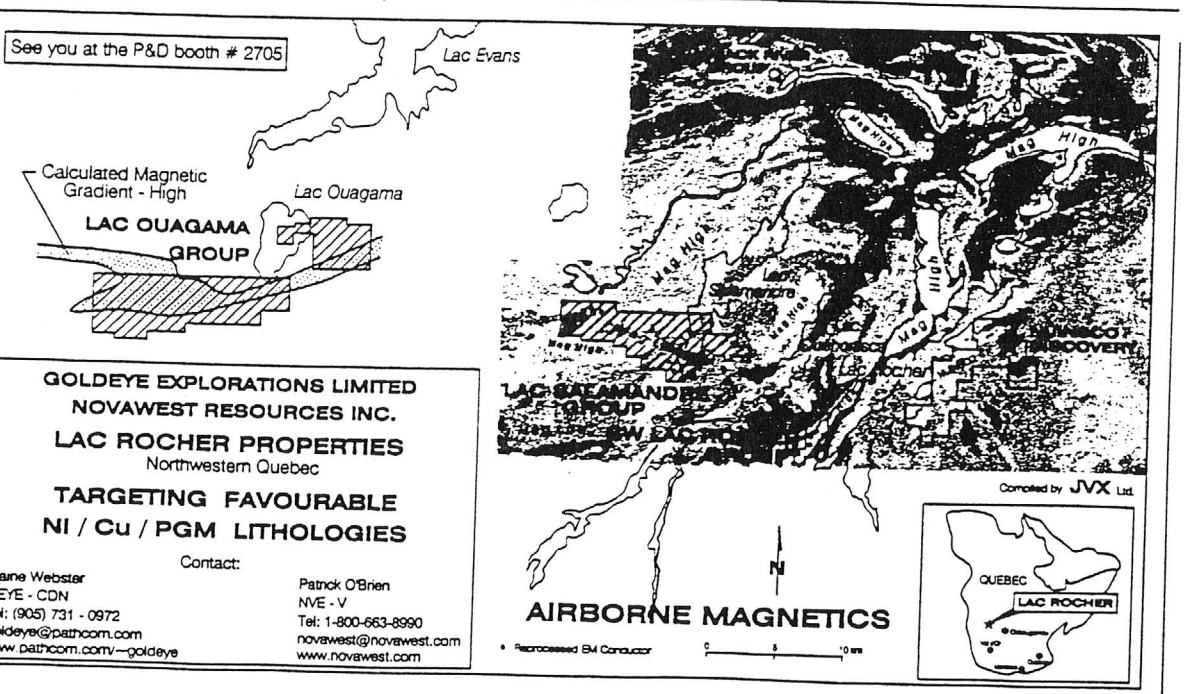
Toronto Stock Ex

Date	Mar
Composite "300"	622
Metals & Minerals	294
Integrated Mine	314
Mining	134
GOLD & Prec Mtls	536
TSE 100 Index	379

UNLIS

Name	Volume
ADR Expl	1,000
Akroken-Ashanti Gold	272,800
Alterra Resources Inc	5,000
Ambrex Mining	307,625
Anatolia Mineral Dvlp	362,000
Augusta Res	181,273
Banro Res	513,566
Black Mountain Minerals	1,272,540
Black Pearl	391,800
Blue Gold International	360,902
Borealis Expl	11,337
Brazilian Res	126,000
Breckenridge Min	25,000
Brownstone Res	3,000
Canuc Res	112,410
Champion Gold	97,600
Citadel Gold	20,000
Columbia Metals Inc	66,000
Complex Minrls	3,000
Conqueror Hldgs	2,100
Conquest Yllknf	150,000
Cons Thmpn-Indk	987
Copperquest	78,000
Davidson Tsdle	17,000
East Asia Gold	400,000
Eloro Resources Ltd	25,666
Emrgng Afrca Gd	100,000
Euro-Nev Wt Nov/98	49,440
European Gold	6,667
Exploro Minrls	139,000
Gammon Lake Resources Ltd	109,835
Goldcorp Wt A Jun 30/99	2,853
Golden Hope	7,000
Goldeye Expl	54,500
Griffin Mining Ltd	146,580
Guyana Gldflds	72,600
Heartland	10,000
High Americn Gd	40,000
High North	313,100
Hornby Bay Exploration	21,450
IBI Grp	763,300
Int'l Lardr Min	150,188
Interquest	23,000
Java Gold	1,750
KWG Resources	8,832
Kayorum Gold	2,100
Kazakstan Gldfld	93,561
Keinick Res	5,000
Lewis Brook Res	3,000
Link Mineral	2,400
Lyndex	116,500
MCK Mining	328,540
MacDonald Oil	9,600
Magnesium Alloy Corp	62,145
Maple Minerals	40,000
Matachewan Cons	105,000
Meridian Res	90,000
Millstream	54,000
Mustang Gld Corp	159,480
Nfld Goldbar	20,000

See you at the P&D booth # 2705



GOLDEYE EXPLORATIONS LIMITED
NOVAWEST RESOURCES INC.
LAC ROCHER PROPERTIES
Northwestern Quebec
TARGETING FAVOURABLE NI / Cu / PGM LITHOLOGIES

Contact:

Blaine Webster
GEYE - CDN
Tel: (905) 731 - 0972
goldeye@pathcom.com
www.pathcom.com/~goldeye

Patrick O'Brien
NVE - V
Tel: 1-800-663-8990
novawest@novawest.com
www.novawest.com

EMERALD MINE MOHAVE COUNTY

NJN WR 11/23/84: Luis Vega, geologist with Duval's Mineral Park Mine reported El Paso Natural Gas sold Emerald Isle (f) Mohave Co. a few years ago to an individual in Wilcox. The BLM microfische list as owner ~~TCS~~ Enterprises Inc., 4449 E. Monte Vista, Tucson, Az. 85712. The reserves are reported by Mr. Vega as over 8 million tons, but he would not disclose the grade.

MG WR 7/19/85: The Emerald Isle (Mohave County) mine is apparently owned jointly by TSC Enterprises (c) and Stewart Title, P O Box 42200, Tucson, Arizona 85733. The deposit is covered chiefly by the Copper Hill Mill lode claim group.

NJN WR 7/24/87: Phil Blacet (card) geologist with Cyprus Bagdad (file) examined the Emerald Isle (file) Mohave County a year ago and had some interest in the property but the environmental problems were a liability. The owners are interested in developing the property and have been trying to purchase some mining equipment from Cyprus' Mineral Park (file) Mohave County.

KAP WR 8/28/87: Jack Pursley, Arizona Mining Association, was in to review the Emerald Isle Mine (file) Mohave County. The association had been contacted by a member company for information on the mine after they had received an inquiry by someone desiring to purchase sulphuric acid for copper leaching at Emerald Isla.

C

R/H

EMERALD ISLE MINE MOHAVE

Les Mead is still experimenting with in-place leaching at Emerald Isle Mine. GW WR 8/26/75

GW/WR 1/13/78 - Mr. Fass said a Mr. Stewart of Willcox, had begun leaching operations at the Emerald Isle Mine. 2/22/78 a.p.

WR GWI 2/10/78 - Bud LaBarr and David Cline, both looking for copper properties that could be leached. Suggested the Zonia and Emerald Isle for starters. 2/24/78 sef

---

KAP/WR 9/14/79 - The owners of the Emerald Isle Mine, Mohave Co. have submitted a patent application on a portion of the property. They claim a four year reserve of instuleachable ore.

Mr. Claude Barron of the El Paso Company (Parent Company of El Paso Natural Gas Company), El Paso, Texas reports his company still owns the Emerald Isle Mine and still has the property under patent procedure. WR MG 11/9/79

MG WR 12/31/82: It is reported that Mr. Bob Clayton of Continental Materials Corporation, (tucson) and other partners have purchased the Emerald Isle Mine, Mohave County from the El Paso Company.

CJH WR, 10/21/83: Visitor: Robert L. Clayton, Consulting Geologist (formerly with Continental Materals Corp. of Tucson) He still holds (with partners) the Emerald Isle, open pit Cu property, just west of Duval's Mineral Park, Mohave Co., He has put together a feasibility study for the erection of an acid-leach, SX-EW copper plant at the Emerald Isle. He is retained by Alta Exploration, a Reno Nv based company. As yet the construction on the proposed 4500 lb./day unit is awaiting a "go" dicsion by Alta Exploration. He allowed us to copy four cost studies based on copper market prices of $0.70, 0.75, 0.85 and 0.95/lb. These Tables are attaced to this report and may be included in the Emerald Isle. Mine file.

RRB WR 10/28/83: Reg Skiles, 764 Magnolia Ave., Pasadena, Ca 91106 reports that he is doing a feasibility study on the Emerald Esle property in Mohave Co. We discussed permitting, water rights and pollution controls and I sent him a copy of "Pertinent Facts" and our "list of Publications".

EMERALD ISLE MINE MOHAVE

Went to the Emerald Isle mine of El Paso Natural Gas Company where Runke said they had been closed since about the middle of August. They now have a cooperative program with the USBM to conduct an experiment on leaching-inplace. Presently the experiment consists only of metallurgical tests. Runke seems to think that he may have some difficulty in convincing the management to sanction this type of operation. However, there remains between a million and a million and a half tons of plus 1% Cu ore. GW WR 10/3/73

Stopped at the Emerald Isle mine of El Paso Natural Gas Company and visited with Les Mead and Bill Elwanger who said they had begun the cooperative leaching-in-place project with the USBM. Presently they are negotiating for a drill capable of drilling 8" or 9" blast holes in a hexagonal pattern 30 feet apart in the pit bottom. Should this arrangement prove successful a series of other holes will be drilled from the surface for the introduction of the leaching solution along with a line of monitoring holes. Mr. Mead is apprehensive of the dilution of the solution as he says that 850-1000 foot core holes previously drilled indicated highly altered granite with considerable water below the ore horizon. Apparently they have found no firm impervious base on which they can recover the leach solution. GW WR 11/7/73

Stopped at the Emerald Isle mine of El Paso Natural Gas where Messrs. Runke, Mead and Horst said they would begin drilling blast holes tomorrow. GW WR 12/5/73

Went to Emerald Isle mine of El Paso Natural Gas Co. where S. M. Runke said he was encouraged with the limited results they have had from their in-place leaching experiment. On March 20, 1974 they applied the acid to the 6 blast holes. Since then they have pumped 100 gal/min. of the solution which assays 0.4 gm Cu/liter. He wants to increase the pumpage rate to at least 500 gal/min. He said the monitoring holes close as 60-70 feet from the blast area have indicated no acidity. The first blast was in a stripped area in the old pit; now holes are being drilled from the surface in the same hexagonal arrangement 50 feet apart with a recovery hole in the center. GW WR 4-3-74

At the Emerald Isle mine of El Paso Natural Gas Co. Mr. Mead said they were circulating 65-75 gpm of solution containing .7 gp liter of Cu and had extracted about 4½ tons of cement in about 6 weeks. He is having difficulty with the very finely divided Al contained in the scrap iron (cans) plugging the underflow of the tickener. They are also having more than their share of mechanical breakdowns. GW WR 5-1-74

Runke was at Emerald Isle and said they had completed 6 more blast holes in the bottom of the pit and had drilled 3 blast holes in the bottom of the pit and had drilled 3 blast holes and 2 output holes from the surface down dip from the pit. They are now down waiting for pumping equipment. He said they were trying for 250 gpm and 1 ton of recovered Cu per day. GW WR 8/27/74

EMERALD ISLE MINE MOHAVE

Les Mead and Bill Elwanger are still repairing equipment but are successful in keeping the mine production to around 800 tons per day. They have had some difficulty with their well. GW WR 9/6/72

Stopped at the Emerald Isle operation of El Paso Natural Gas Co. where Mr. Mead said they were rocking along about as usual but would like a more profitable deposit on which to work. GW WR 11/2/72

At the Emerald Isle mine of El Paso Natural Gas Company repair and maintenance is still the main problem. GW WR 12/6/72

Visited with Bill Elwanger and Homer Hale at the Emerald Isle operation of El Paso Natural Gas Company. Their operation is about as usual but they are doing some exploratory drilling southeast of the pit. The first hole assayed 0.4% Cu. GW WR 1/4/73 .

Saw Messrs. Runke, mead, Elwanger and at the Emerald Isle operation of El Paso Natural Gas Company. They have finished drilling which was discouraging as the best assay obtained was 0.77% Cu. They are still plagued with the high maintenance costs on the old equipment. GW WR 2/8/73

At the Emerald Isle operation of El Paso Natural Gas Company the extreme wet weather has all but shut their pit operation down as they don't have pump capacity to cope with the increased water flow and they think they are merely circulating the water. GW WR 3/7/73

Mr. Elwanger at the Emerald Isle operation of El Paso Natural Gas invited me on an inspection of the open pit. During the past 2 - 3 months the operation has been hampered by an excess of water for which they were unprepared. The pit resembles a tea cup in many respects. A major portion of the overburden has been piled on the ore deposit and the main haulage ramp was located on the south side of the pit where the balance of the accessible ore remains. A fault trending slightly NE and dipping westerly at about 45-50° cuts across the pit area and appears to have displaced the ore deposit to some extent. Mr. Elwanger said the ore on the hanging wall of the fault was of slightly better grade than the footwall ore. Although the fault has been uncovered the ore in it hasn't been removed, perhaps because the primary crushing and the conveyor system are on it. Without considerable stripping, 80-100 feet, this operation, it is thought, will cease in 8 or 9 months. GW - WR 4-6-73

Visited with Messrs. Runke and Mead at the Emerald Isle operation of El Paso Natural Gas. They too have a churn drill prospecting beyond the limits of the present pit, but to date haven't found any ore grade material. GW - WR 5-4-73

All the staff at Emerald Isle mine were gone but saw Runke later in the restuarant in Kingman, he said things were "rocking along as usual". GW WR 6-6-73

Then went up to El Paso Natural Gas Company's Emerald Isle mine, where I met Bill Elwanger and Les Mead. Had a nice visit with Elwanger, who 18 years ago was on a USBM drill job with me in northwestern South Dakota. Mr. Mead says they are striving for a consistent 800 T/D mine production. WR GW 11/4/71

Visited the Emerald Isle operation of El Paso Natural Gas Company, where a long conversation was enjoyed with Sid Runke, chief metallurgist. This operation produces approximately 320,000 lbs. of Cu per month from about 17,500 tons of ore (800 T/day). An impression that El Paso is seeking another Cu deposit in Arizona was gained from Mr. Runke's inquiries. It was suggested they take a longer look at the Battleship Pk. deposit as well as John Lemon's Buckeye Cu. GW WR 12/3/71

The Emerald Isle copper operation of the El Paso Natural Gas Company operated continously during the period at a rate slightly under 800 T/day. GW QR 9/71

Saw Messrs. Mead and Elwanger at El Paso Nat. Gas Co., Emerald Isle Mine. They appear some-what apprehensive of going underground to mine the remaining ½ million tons of ore. GW WR 1/5/72

Saw Sid Runke and Les Mead at the Emerald Isle mine of El Paso Natural Gas. They are looking for deposits of oxide copper in the Gila Bend Mountains northwest of Gila Bend. Runke doesn't want to deal with the people who have the White Mesa deposit. The Moore mine of Chris Mueller was suggested. GW WR 2/2/72

Emerald Isle Mine, where things are about as usual. Messrs. Dudley and McFate's Cu prospects were mentioned. GW WR 3/3/72

The Emerald Isle copper leaching operation of the El Paso Natural Gas Company continued at their normal rate of about 800 tons of ore per day. They, however, anticipate a change in mining method; as work progresses down dip the amount of overburden increases thereby decreasing the economic feasibility. GW QR 2/72

Bill Elwanger says the Emerald Isle operation of El Paso Natural Gas Company is "limping" along as usual. GW WR 5/4/72

Les Mead at the Emerald Isle operation of El Paso Natural Gas Company said they were pretty well straightened out from re-lining the rod-mill and pulling the pump on one of their deep wells. He made a few changes in the active mine list for 1972. GW WR 6/8/72

Stopped at the Emerald Isle operation of El Paso Natural Gas. Mr. Mead wasn't available but Bill Elwanger, mine foreman, said they were "limping" along about as usual. For some time now they have experienced increasing repairs on the mining equipment, however, they have maintained a steady production of 800 tons daily. GW WR 7/21/72

EMERALD ISLE MINE MOHAVE COUNTY

Visited with Bill Elwanger at the Emerald Isle, he said bottom of pit was pretty sloppy following the storm. FTJ WR 3-6-70

Emerald Isle operating at usual rate. FTJ Quarterly Report 4-3-70

Visited Emerald Isle mine and plant - operations normal. FTJ WR 5-8-70

Visited Bill Elwanger and Les Mead at the Emerald Isle mine. They were drilling some deep holes around present pit in hopes of enlarging reserves. FTJ WR 7-11-70

Emerald Isle mine produced at its regular rate for the year. FTJ Annual Report 6-30-70

Visit with Homer Hale - operations as usual. FTJ WR 9-4-70

Visited with Les Mead at Emerald Isle - operations normal. FTJ WR 11-6-70

Active Mine List 5-1970 - 44 men - Les Mead SUPT.

To Emerald Isle - they were having water trouble - frozen pipes etc. FTJ Wr 1-8-71

Mineral Park mine and Emerald Isle were operating at their regular rate. FTJ Quarterly Report 1-13-71

Active Mine List Oct. 1970 - 42 men - L. Mead, Supt.

To Emerald Isle. Visit with Mr. Runke and Les Mead. No changes in operation. FTJ WR 5-10-71

Emerald Isle, division of El Paso Gas produced at their regular rate throughout the year. FTJ Annual Report 8-19-71

Stopped at El Paso Natural Gas Co. Emerald Isle mine and got acquainted with Mr. Mead, mgr. He was somewhat wrought up with a visit by four U. S. B. M. and one State Mine Inspector. GW WR 9/3/71

Dir. of Mining - August 1971 - 42 employees.

EMERALD ISLE MINE MOHAVE COUNTY

Mr. Horst called from El Paso and said that Les Mead was Supt. and C. F. Ellwanger General Maintenance and Mine Foreman, Homer Hale is mill foreman. P.O. Box 1313, Kingman is the address and they have 39 men working. Note LP 7-31-68

Visit with Les Mead at Emerald Isle. Their well drilling at Santa Claus was fairly successful. Depth 2100',produces 200 gpm. A second well is started 1200 feet SE of No. 1. FTJ WR 9-10-68

Active Mine List Oct. 1968 - 36 men

Visit with Les Mead and Bill Ellwanger at Emerald Isle. They are still having a water shortage. Their second well was down 2400' and they were reaming the hole. FTJ WR 11-8-68

Mine visit to Emerald Isle, interview Bill Ellwanger. Plant idle due to crusher breakdown and water shortage. They are drilling their third well west of Christmas Tree. FTJ WR 1-10-69

Visit to Emerald Isle Mine and interview with Les Mead, Supt. Mill up to capacity. The third well, depth 23,000 ft. making about 170 gpm. FTJ WR 3-7-69

Active Mine List April 1969 - 42 men

Emerald Isle visit - Sloppy weather - but Runke said they now have enough water and are getting along OK. FPK note on field trip 5-15-69

Visited Emerald Isle - Mr. Runke said everything was in order. FTJ WR 7-11-69

Emerald Isle Division of El Paso Natural Gas - mining and milling at their regular rate. FTJ QR 7-15-69

Visited Emerald Isle met with Les Mead and Bill Ellwanger. Their water problems appear to be beaten. FTJ WR 9-5-69

Active Mine List Oct. 1969 - 40 men - S. M. Runke, Mgr.

Visited Emerald Isle. Interview with Bill Ellwanger who said they were having water pump troubles, otherwise operations normal. FTJ WR 11-7-69

Copper recovery will be by the leach-precipitation-flotation method with an eventual target of handling 1,000 tons of ore per day. The operation is expected to employ 35 to 40 persons regularly. C. F. Elwanger has been in charge of construction.
Taken from Pay Dirt June 23, 1967

Visited Emerald Isle - construction of mill should be completed in a couple of months. El Paso's men were not at plant or mine. Most all work is contracted out. FTJ WR 7-7-67

In the State of Arizona, El Paso Natural Gas Co. is engaged in two projects totaling about $2,600,000 that are scheduled to commence the production of copper in the current year of 1967.
At a site about 15 miles northwest of Kingman in Mohave County, El Paso Natural Gas Co. is developing the Emerald Isle deposit, which is a relatively small orebody estimated at 1,500,000 tons of 1% oxide copper ore. The company will use open pit methods and is constructing a 800-ton per day mill incorporating a leaching-precipitation-flotation process to recover a medium grade cement copper. By mid-summer, El Paso Natural Gas expects to commence production at the Emerald Isle Plant employing about 40 persons.
Taken from the Skillings Mining Review May 20 p. 12

Interview with Les Mead, Mill Superintendent at Emerald Isle.

They had made a trial run on Tuesday, and were making a few minor changes. They will not be up to capacity (1000 tpd) until a better water supply is assured. They plan to obtain water from the Tennessee Shaft. FTJ WR 9-8-67

Interview with Mr. Runke at Emerald Isle. They were shut down temporarily for small changes in the mill. FTJ WR 11-10-67

Visited Emerald Isle, which was down for some changes and adjustments. None of the supervisory personnel were available. FTJ WR 1-5-68

Visited with Les Mead, Mill Supt. at the Emerald Isle, who showed the mill. They are milling about 700-750 tpd making an 83-85% cement copper. FTJ WR 3-8-68

Active Mine List Nov. 1967 - 35 men
Active Mine List April 1968 - 36 men

Visited the Emerald Isle Mine. Mill was down due to broken shaft. They also are having water shortage trouble. H. Horst said they had deepened Christmas Tree Well from 800' to 1200', but was small (4") and difficult to find high capacity pump that will fit the hole. Another well is planned more distant than Christmas Tree. FTJ WR 5-10-68

Visited with Les Mead at Emerald Isle. The mill was shut down due to water shortage. Interview with Herb Lewis, geologist who was logging drill cuttings. The drilling is west of Christmas Tree restaurant at Santa Claus. They were in sand at 900' and hoped for gravel and water at greater depth. FTJ WR 7-12-68

EMERALD ISLE MINE MOHAVE COUNTY

Visited El Paso Gas at Emerald Isle. They are drilling with a truck mounted rotary drill using air for sample collection. Four holes have been drilled to date with encouraging results. H. W. Horst is in charge of the work and resides at Holiday House, Kingman. FTJ WR 3-4-66

El Paso Gas are actively exploring the Emerald Isle deposit and are examining other prospects in the county. FTJ QR 7-8-66

Interviewed Mr. L.O. Davis and Herb Lewis at Tuba City Mill, they are concentrating on a flow sheet to handle Emerald Isle ore. FTJ WR 9-16-66

Visited Emerald Isle, Homer Hale is in charge. Core drilling is continued besides experimental work on metallurgy of the ore. FTJ WR 9-9-66

Visited Emerald Isle - no one around - but learned they are working on flow sheet. FTJ WR 11-4-66

Visited Emerald Isle where activity was high. Had short interview with Darl Lewis, metallurgist and S. M. Runke, Supt. Both were busy with a dozen or more salesmen. M. M. Sundt Construction Co. of Tucson is doing the stripping. The area stripped is about 300' wide and about 700' long (estimated). The deepest of the strip area is about 40' below the original ground level. Oxides of copper were appearing in the bottom of the pit. Leach tanks were under construction besides other activities. FTJ WR 1-7-67

Interview with Wm. Ellwanger, Maintenance & Pit Supt. at Emerald Isle. S. M. Runke is manager, Les Mead, Supt., Homer Hale, Mill Supt. They will employ the L.P.F. method of recovery with an eventual target of 1000 tons per day. Mill building was under construction, and ore encountered in strip operation stockpiled in center of pit. Crushing will be done in the pit, both primary crushing, using a 25 x 40 Cedar Rapids, and secondary 5' cone crusher. Ore will be transported to storage tanks near mill by conveyor. From storage to 8 x 12 Marcy Rod mill to mill circuit. Operations are scheduled to begin around June 1. FTJ WR 3-10-67

El Paso Gas continued to strip the Emerald Isle deposit and construction of the LPF plant and facilities. FTJ QR 4-5-67

Visited Emerald Isle and short interview with Mr. Runke and Darl Lewis. Construction going at full blast. Conveyor from pit to storage tanks was about 50% complete. Stripping continues as other construction is also carried on. FTJ WR 5-5-67

Both mine-stripping and mill-construction are going full blast at the Emerald Isle copper mine. 15 miles northwest of Kingman, Arizona, under development by El Paso Natural Gas Company. Crushing - both primary and secondary - is to be done in the pit and ore transported to storage tanks near the mill by conveyor. This conveyor is more than half completed and the mine and mill are expected to be in production by the middle of the year.

EMERALD ISLE

Ridge Mining Company, 151 S. Tucson Blvd, Tucson, Arizona (1966), a subsidiary of a gulf coast oil company, reportedly has hired the McPhar Geophysical Corporation of Toronto, Canada to conduct a self potential survey around the old Emerald Isle copper deposit at Chloride, Arizona. Taken from Mining World Jan. 1960 p. 67

Visited the Emerald Isle mine. This property has recently been taken over by Duval. TPL WR 11-19-60

Visited Emerald Isle mine where Pat Patterson and two men were preparing a heap leach. A large area is cleared off and covered with well packed tailings, and forms were being placed for a concrete precipitating plant. Mr. Patterson says he has a good well with plenty of water. EGW WR 3-13-64

Visited Emerald Isle mine and leach site, about 18,000 tons on leach dump. EGW WR 5-6-64

Visited Emerald Isle mine, three men working on the precipitation plant. There is about 18,000 tons of ore stockpiled on the leach area and pipeline laid, but as yet no solution started on the heap. EGW WR 7-14-64

Visited Emerald Isle, no activity. Learned later work has stopped until concrete is set in precipitating plant. EGW WR 9-15-64

At time of visit 60-65 gpm were going through the precipitating plant. A new pump is to be installed to increase production. EGW WR 11-6-64

Visited Emerald Isle and interviewed Pat Patterson. He has 65-70 tons of cement copper ready to ship. He hopes to sell to a chemical company. At present he is having trouble with the solution freezing on the dump. EGW WR 3-5-65

Visited Emerald Isle mine - 3 men employed. About 1000# of cement copper is produced daily. A new acid (formula unknown) is to be tried that may increase capacity and grade of product. FTJ WR 7-9-65

Visited Emerald Isle. Patterson said El Paso Gas has option but no decision has been reached. FTJ WR 9-10-65

Visited Pat Patterson at Emerald Isle. He is still operating but deal with El Paso Gas is being consumated. He did not know if Western Equities is in the deal as he has been negotiating with El Paso Gas. FTJ WR 11-5-65

Visited Emerald Isle. Mr. Patterson was cleaning up vats and preparing to let El Paso Gas take over on Jan. 10. The delay in the takeover is due to unclear title. The claims (8) were located in 1906. The Federal government withdrew the 8 claims for a power site in 1953. This was unknown to Patterson who had to amend the locations to cure title before El Paso would consumate the agreement. FTJ WR 1-7-66

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Emerald Isle mine of El Paso Natural Gas

Date January 15, 1976

District

Engineer John H. Jett, Director

Subject:

The mine was shut down the first part of November. All equipment and surface facilities were sold to Minerals Equipment Company of Salt Lake City. They have a branch office in Phoenix.

Mr. Bob Agee, former employee, was acting as a watchman for Minerals Equipment Co. He stated an estimate of 4½ million pounds of recoverable copper had been made on the blasted material in the bottom of the pit. They were in the process of installing pumps for the in-situ leaching program when the plug was pulled on the project.

El Paso did obtain patent to the land.

See El Paso Natural Gas Company file
(Desk Mining File) pp 8/29/77

March 13, 1945

Mr. James Depoe
Chloride, Arizona

Dear Mr. Depoe:

We have received your application for a recommendation for an O.D.T. certificate and for gas for same, and take pleasure in enclosing same herewith.

It is better that we return this recommendation together with the application to you, for proper forwarding by yourself to the O.D.T. office, rather than send it direct. They often get mislaid when we attempt to send them in direct.

Trusting you will be fixed up without delay.

Yours very truly,

Chas. H. Dunning
Director

CHD:LP
Enc.

James Depoe
Chloride, Arizona
March 10, 1945

Department of Mineral Resources
Phoenix, Arizona

Gentlemen:

Enclosed you will find a letter from the Office of Defense Transportation stating that they require a recommendation from your department before they will allot the gas I require.

Am enclosing my application for a certificate of war necessity as it contains detailed information as to what the gasoline is to be used for and where the truck will be operated. Please return this application with your recommendation.

I am one of the contractors for the underground mining at the Emerald Isle Copper mine located 5 miles south of Chloride Ariz. This truck is to be used in transporting crew to and from the mine and hauling supplies to the mine.

Prompt action on this matter will be appreciated.

Very truly yours,

James Depoe

James Depoe

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Filing Information

File System.....

File No.....

This chart to be used for gallons of gasoline required per month.

Date.....

Name of Mine.....

Owner or Operator.....

Address.....

Mine Location.....

PRESENT OPERATIONS: (check X)

Production....X....; Development.....; Financing.....; Sale of mine.....;

Experimental (sampling).....; Owner's occasional trip.....;

Other (specify).....

PRODUCTION: **Past and Future.**

	Tons
Approx. tons last 3 months	
Approx. present rate per 3 months	
Anticipated rate next 3 months	
If in distant future check (X) here	

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars			
Light or Service Trucks			
Ore Hauling Trucks			
Compressors			
Other Mine or Mill Eqpt.			

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

REMARKS:

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By.....

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Date: 12-30-42

Name of Mine: El Sol, Manganese Co

Owner or Operator: Calvin C. Hyde

Address: Del Valley Hot Springs

Mine Location: Near Kingman & on Mesa

Filing Information

File System:

File No.:

This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production.....; Development.....; Financing.....; Sale of mine.....;

Experimental (sampling).....; Owner's occasional trip.....;

Other (specify).....

PRODUCTION: **Past and Future.**

	Tons
Approx. tons last 3 months	
Approx. present rate per 3 months	
Anticipated rate next 3 months	
If in distant future check (X) here	

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars	1941 Chevy	2560	171
Light or Service Trucks			
Ore Hauling Trucks			
Compressors			
Other Mine or Mill Eqpt.			

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals. 171 gal/mo

Copper

REMARKS:

This company has a prospecting copper mine near Kingman (30 tons shipped) and is equipped with a small mill shipping

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By: George Wilhelm

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Filing Information

File System.....

File No.....

This chart to be used for gallons of gasoline required per month.

Date.....November 4, 1944.....

Name of Mine.....Emerald Isle (Contractor).....

Contractor:

~~Owner or Operator~~.....James Depoe,.....

Address.....Chloride, Arizona.

Mine Location.....14 miles north of Kingman

PRESENT OPERATIONS: (check X)

Production.....; Development.....; Financing.....; Sale of mine.....;

Experimental (sampling).....; Owner's occasional trip.....;

Other (specify).....Contracting in mine.

PRODUCTION: **Past and Future.**

	Tons
Approx. tons last 3 months	
Approx. present rate per 3 months	
Anticipated rate next 3 months	
If in distant future check (X) here	

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars			
Light or Service Trucks			
Ore Hauling Trucks			
Compressors	100-HP	208	30*
Other Mine or Mill Eqpt.	Hoist 18-Hp	208	600
			630

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals. * For starting only.

Copper

REMARKS:

Applicant is contracting stoping and shipping ore from mine. Requests ~~requests~~ 1890 gallons of gasoline for period of 3 months. Suggest his request be granted.

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By.....Elgin B. Holt

Elgin B. Holt, Field Engr.

October 26, 1942

Ogden C. Chase, President
Emerald Isle Copper Co.
Boggs Building
Las Vegas, Nevada

Dear Mr. Chase:

We note in a copy of a letter from W. C. Broadgate to Mr. R. A. Ward of Prescott, Arizona, that Mr. Broadgate can possibly expedite your loan application , but that in order to do so he must have a letter of authorization from you allowing him to act as your representative.

This is necessary for the reason that the Reconstruction Finance Corporation is reluctant to discuss matters pertaining to loans to other than authorized representatives of the applicant. This does not mean that Mr. Broadgate would be given legal power to act for you but merely authorize him to discuss your application with the proper parties.

We suggest that if you have not already sent such a letter of authorization, that you do so immediately.

Very truly yours

Earl F. Hastings
Assistant Director &
Projects Engineer

EFH:BA

cc: W. C. Broadgate
Hotel Harrington
11th & E Sts., N.W.
Washington, D. C.

Washington, D.C.
Oct. 15, 1942

SUBJECT: Mine Loans
Emerald Isle Copper Co.

I note the ~~xxxxxxxxxx~~ Hastings letter on this subject to Chase.

Please note the letter attached, and return. You have a copy of it in the files but might not be able to locate it.

I never received any answer from Ward or Chase.

If Chase wants me to follow this at the WPB, please have him send me the letter of authorization, otherwise all transations are considered confidentdial between the WPB and the client.

Bill Broadgate

Emerald Isle Copper Co.

Boggs Building
Las Vegas, Nevada

October 21, 1942.

Mr. Earl F. Hastings,
Assistant Director & Projects Engineer
Department of Mineral Resources
413 Home Builders Bldg.,
Phoenix, Ariz.

Dear Mr. Hastings:

Thanks very much for your very nice letter of October 13th advising of the visit you had with Mr. Frank Ayer of the WPB, Copper Branch.

Have not as yet had any word from the RFC, so I am rather at sea as to what suggestions have been made by Mr. Ayer to the RFC. Naturally, we are anxious to follow out any suggestions they may have to make. As a matter of fact, I have told Mr. Ayer that we are perfectly willing that the Government determine the kind and size of operation best suited for Emerald Isle; that they may place the spending of the money in the hands of any reliable institution they may choose, and that if they so desire they may also appoint any reliable mine operating concern to supervise the operation of Emerald Isle during the period required to repay the loan. Under the circumstances, I can see no reason why there should be a continuation of delays we have experienced in conjunction with this loan application. To me it is most regrettable, in view of the large number of employees of the Minerals Division of the WPB, that they have not had a single representative on the Emerald Isle ground, despite the fact that the application was made by air mail on the 15th of December last. If we are to believe what we read, we are using silver which cost the Government over seventy cents an ounce to conserve copper and in view of such a critical situation it does seem to me that any such source of copper as presented by the facts in our application for loan should certainly have received prompt investigation by the RFC and/or the WPB.

Let me assure you, Mr. Hastings, that I greatly appreciate and thank you for the interest and the helpful attitude you and your department have taken and especially as we have waited so terribly long in getting any action on our loan, and the favors will not be forgotten. It is my very sincere hope that Mr. Broadgate will use his good offices in an endeavor to get some favorable action in the very near future, and I hope soon to hear that the RFC has their engineer on the way to inspect the set-up at Emerald Isle.

October 21, 1942.

Mr. Hastings:

Becoming rather discouraged in not getting any favorable action on the loan, the writer discussed my situation with Mr. How, of the Western-Knapp Engineering Company of San Francisco, and Mr. How seemed very interested. He told me that in view of the fact that he was taking a trip to New York and Washington, with my permission he would be only too glad to discuss our application for loan with the WPB. Unfortunately while he was there last week, apparently Mr. Ayer was away from his office. I was to have heard the outcome of the discussion, but not having heard from Mr. How yet, undoubtedly he has been unable as yet to contact Mr. Ayer and, no doubt, I will hear from him later. Of course, Mr. How would like to have the contract for the plant construction and also I take it would prefer to have Government funds to do the job with, so he would be very interested in getting a promise of the finances from the RFC, if possible. However, he has expressed himself that if his investigation shows the property to represent a safe investment of money, his concern might even be interested in advancing the funds to place Emerald Isle in production. Anyway, one way or the other, I am hopeful, not only for ourselves, but because of the critical need of copper by the Government in the war effort, that we can get something doing at Emerald Isle in the very near future.

Again thanking you and assuring you I will appreciate anything of interest you might see fit to convey to me at any time, I remain

Sincerely yours,

Ogden C. Chase

President.

OCC:el

October 13, 1942

Mr. Ogden C. Chase
Emerald Isle Copper Corp.
Boggs Building
Las Vegas, Nevada

Dear Mr. Chase:

In a recent survey of production possibilities for the War Production Board and the Army-Navy Munitions Board your Emerald Isle property was outlined as being a prospective producer on which some action should be taken.

Mr. Frank Ayer of the WPB Copper Branch was in the office yesterday and the Emerald Isle, among others, was discussed. Mr. Ayer stated that the Emerald Isle was receiving very serious consideration by the WPB. No doubt you will hear from the RFC relative to your loan in the near future as they, the RFC, usually follow suggestions made by the WPB.

We will ask Mr. W. C. Broadgate who represents the Department in Washington to inquire from time to time relative to yonr application so that it may be kept fresh in the minds of the examining engineers.

Very truly yours,

Earl F. Hastings
Assistant Director
& Projects Engineer

EFH:BA
cc:W.C. Broadgate

Kingman, Arizona, Oct. 8, 1942

M E M O R A N D U M

To: J. S. Coupal

From: Elgin B. Holt

Subject: Emerald Isle

I am herewith enclosing a copy of a letter received from Ogden C. Chase, to which is attached a report from the General Engineering Company concerning laboratory tests on Emerald Isle ores. The reason I did not send you Mr. Chase's original letter was due to the fact it was in the nature, partly, of a personal letter to me in which he discussed some mining plans he has been figuring on in Mexico; so I merely copied parts of this letter which refer to the Emerald Isle only.

It seems that the joker in these metallurgical tests lies in the fact that Messrs. Chase & Weeks wanted General Engineering to check the Jacobson results only, which were obtained treating minus 3/4-inch ore, with around a 5% H_2SO_4 solution. You will note that General Engineering fiddled around for months and did everything else but check the said results; but even then a close scrutiny of their results seem to check Jacobson on the nose.

Mr. Chase wants us to help with the Washington bunch in pushing his loan along; so suggest that you forward the "dope" I am mailing you herewith on to Bill Broadgate, in Washington, with instructions to get some action stirred up concerning Chase's application.

My only criticism of the said loan application is that it asks for only $450,000, when I believe this project should have a round million dollars of folding money. That instead of completing a 300-ton leaching plant, at least a 700-ton plant should be installed.

If the Army & Navy Munitions Board are really serious in wanting to know why it is that more copper is not coming out of the Arizona mines, the case history of Emerald Isle should prove very interesting, indeed, to them.

Elgin B. Holt

Elgin B. Holt.

cc - Ogden C. Chase

EMERALD ISLE COPPER COMPANY

Boggs Building

Las Vegas, Nevada

C O P Y

October 2, 1942

Mr. Elgin B. Holt,
P. O. Box 188,
Kingman, Ariz.

Dear Mr. Holt:

Your letter of August 1 received, of course, a long time ago, but I had it placed in the "hold" file because when it was received I expected every day to have the report from the General Engineering Company on the metallurgy of the Emerald Isle ore. For some unknown reason we were continually disappointed in delay after delay in getting this report and only recently sent it to Washington and I am enclosing a copy herewith. The day the report came, I had copies made of it and told Mr. Weeks to take an extra copy down to you. When he was in here the other day, he said he had tried to contact you, but you were out of town, so I told him I would write you as I had a letter from you which I intended to answer and would send the report.

There is something strange about this entire loan application, even to the metallurgical tests run by the General Engineering Company, as from the very beginning the history of the whole thing has been one of delayed action. You will recall when I talked to you, I told you the report would be favorable, based on information I had received from the Engineering company. They later told me they had to re-run the tests, as they had run into some difficulties, used too high acid and almost 60 days were consumed thereafter before they finally submitted a report, and then you will note they state that it represents only test work done on the open pit samples and that we might expect another report on the underground samples. This is the first knowledge we had that they were making separate tests of the two and it really amounts to a lot of nonsense, because the underground samples represent only about six feet, or the height of the drift, above bedrock, whereas the open pit sampling will be an average of everything from bedrock to the surface. These should have been mixed at about the proportions as they would be ordinarily. I have submitted the report to the War Production Board and have explained that their findings as regards the open pit sampling should be representative, whereas the underground would not be. I have also asked them for a decision at the earliest possible date with reference to the loan. Will call your attention to another thing in connection with the test work done on the 3" minus material which they found to be unsatisfactory. You will note that the majority of the days this material was under test, the acid content was below 1%. It looks like they worked backwards, in that on fresh ore they should have commenced with low acid content and increased the acid content as the material became more leached.

In practice, of course, there would be several heaps of ore. The high acid solution would be used on the most leached piles and the fresher piles used with the lesser acid inorder to make it as neutral as possible. Many of the days consumed in their tests were with such low acid content as to be practically ineffective. Of course, any leaching man would find this report a favorable one. It practically confirms Mr. Jacobson's experience with the ore in that the acid consumed was about two pounds of acid per pound of copper, and the iron consumed right at pound for pound. I am just a little disturbed about the way this was handled with Engineering and the way the whole loan was handled, as you know the Anaconda Company is not very favorably disposed toward me, and I am sure if some in Salt Lake could, they would block anything I undertook.

I am very disappointed that Mr. Weeks was unable to contact you when the report went in, as I feel that valuable time has been lost, and I did want him to go over the full detail of the report with you as he understands thoroughly the leaching method he has partially set up at Emerald Isle and also is most conversant with the report of the General Engineering Company.

With best wishes and kindest personal regards, I remain

Sincerely yours,

Ogden C. Chase,
President.

OCC-mn
Enc.

THE GENERAL ENGINEERING COMPANY

INCORPORATED

CONSULTING ENGINEERS

ORE TESTING

No. 159 PIERPONT STREET

CABLE ADDRESS, GECORING

SALT LAKE CITY, UTAH.

August 31, 1942

Mr. Earl F. Hastings
Asst. Director and Projects Engineer
Department of Mineral Resources,
413 Home Builders Building,
Phoenix, Arizona

Dear Hastings:

I was quite interested to get your letter of August 28th, and to note from the same that you have arrived in the United States safely, presumably, accompanied by your family.

While the United States is not a very happy place to live in at the present time, it certainly beats any country I know of, but we have lots of trouble and tribulation ahead of us before we can return to normal times.

With reference to Emerald Isle, near Chloride, Arizona, it is not correct to say that we conducted an examination of this property. We did send a man to the property to get an independent sample to be brought here for test work, and this test work has now been going on for several weeks. We shall be rendering our report sometime this week to Mr. Ogden C. Chase, President.

All I can tell you at the present time is that the whole proposition looks full of promise. Whether they will be able to satisfy the R.F.C. loan for which they have applied, I do not know, but I am sure the whole proposition has merit, if the operations are properly and intelligently conducted, and they are willing to be governed by the method of treatment as developed during the test work we have been carrying on.

With kindest regards to Mrs. Hastings and family.

Yours very truly,

Ernest Gayford

Ernest Gayford, President

EG:mo

August 28, 1942

Mr. Ernest Gayford, Vice President
General Engineers Company
159 Pierpont Street
Salt Lake City, Utah

Dear Mr. Gayford:

I understand that you recently conducted an examination of the Emerald Isle property near Chloride, Arizona in connection with their application for an R.F.C. loan. We are, of course, intensely interested in all mining properties in the state and are wondering if you could, without violating ethics, give us some idea as to the conclusion reached from your examination.

Please give my best regards to Howard.

Sincerely yours,

Earl F. Hastings, Assistant Director
and Projects Engineer

EFH:LP

Washington, D.C.
Nov. 25, 1942

SUBJECT: Mine Loan project
WPB-RFC
Emerald Isle Copper Co.
Ogden C. Chase.

As long as Mr. Chase has a representative here looking after his interests, I hardly think it would be a good idea for us to take this matter up.

As I understand it, our offer was made to look after this for Chase because he was not getting results and had no one here to represnt him.

I should, of course, be glad to help How, but I believe that the whole deal is now up to the Copper Branch, Production Section, and it is merely a matter of him convincing them of the worth of the project.

Confidentially, I think they are not assured of sufficient ore being proven and I think they want, as Chase indicates, some drilling and perhaps test shaft work to indicate more clearly the extent of the deposit before spending money for plant.

I shall leave it, then, for Mr. Chase to inform Mr. How that he may contact me if he wishes so that I will not appear to be butting into the deal by contacting How first.

Bill Broadgate

Emerald Isle Copper Co.

Boggs Building
Las Vegas, Nevada

November 19, 1942.

Mr. Earl F. Hastings
Assistant Director and Projects Engineer
413 Home Builders Bldg.,
Phoenix, Ariz.

Dear Mr. Hastings:

Your letter of October 26th has not been answered sooner due to the fact I have been away from the office with the flu, and before that spent considerable time at the Emerald Isle property.

In view of the fact that we were getting no where with the WPB, I got in touch with Mr. How of the Western Knapp Engineering Company of San Francisco in connection with our Emerald Isle set-up, who was then on his way to Washington and asked that he intervene for us and find out just what was holding things up. When Mr. Ayer returned from Arizona, Mr. How had a talk with him and they got together on a program. In other words, the WPB agreed to make the loan providing the Western Knapp Engineering Company would thoroly sample the mine, estimate the tonnage and make a recommendation. Also, I have authorized the WPB to make this loan thru the Western Knapp Engineering Company providing their sampling, testing and tonnage estimates are satisfactory. The Western Knapp had their engineer on the property for about ten days, took about 150 samples and they were sent away a week ago last Monday for assay and testing. Just what the next step will be, I don't know, but I do understand they may want to put down some drill holes to prove up tonnage, which I understand the Government will advance the money for. Of course, it seems to me that there is sufficient ore in sight and sufficient done on the property to justify some kind of a loan to get the thing in operation, but apparently they have decided on a definite program which will be carried forward.

I am sending you an extra copy of this letter so that you can, if you wish, send it along to Mr. Broadgate. It would be very nice if Mr. Broadgate could get in touch with Mr. How, who is stopping, I understand, at the Mayflower Hotel there.

I want very much to follow out any suggestions you might have to make and you appreciate, of course, I do not wish to do anything which might embarass Mr. How of the Western Knapp. You may be sure I very much appreciate the splendid interest and help you have rendered.

Thanking you and with kind regards, I remain

Sincerely yours,

Robert C. Chase

President.

Emerald Isle Copper Co.

Valley National Building

Tucson, Arizona

April 20, 1944.

Mr. J. S. Coupal, Director,
Dept of Mineral Resources,
304 Home Builders Building,
Phoenix, Arizona.

Dear Mr. Coupal:

I am very glad to note yours of the 17th and that you have expressed yourself as being willing to aid us in every way possible in the keeping of our employees at Emerald Isle.

It seems to me that this administration have become specialists in discrimination and suppression of the small business, and I am sure that all of the small Western miners would rise in a body to have this matter changed in Washington. It seems to me that the various departments there work in cross purposes amongst themselves -- one branch authorizes production and pays bonus for it, and another branch will completely eliminate the small miner from participating in the benefits of retaining labor. I am sure that your efforts towards bringing a readjustment of these practices will be most gratefully appreciated by all types of small businesses.

Again thanking you for your interest, I am

Very truly yours,

C. L. Short

C. L. Short,
Emerald Isle Copper Co.

CLS:dm

April 17, 1944

Mr. C. L. Short
Emerald Isle Copper Co.
Valley National Building
Tucson, Arizona

Dear Mr. Short:

Thank you for your letter of April 15 and if the question of the reclassification of the man you mention comes to our attention, we will follow it through and do our utmost to keep this man available for you. There seems no chance of keeping a man under 22 out and it will be difficult to keep those under 26.

I believe it might pay for you to write a letter to A. C. Nebeker, Technical Advisor, W.P.B., Security Building, Phoenix, Arizona, making an application by letter to the W.P.B. to have the Emerald Isle placed on the critical list. The basis for placing a man on the critical list is the pounds of copper produced per man and you may not be able to state this until you get into operation. I fully realize that this makes a vicious circle and without the men you cannot get production.

We have taken up the question of placing mines on the critical labor list through Mr. Nebeker and he is working on that subject with Washington officials of the War Production Board.

Yours very truly,

J. S. Coupal, Director

JSC:LP

Emerald Isle Copper Co.

Valley National Building

Tucson, Arizona

April 15, 1944.

Mr. J. S. Coupal, Director,
Department of Mineral Resources,
413 Home Builders Building,
128 North 1st Avenue,
Phoenix, Arizona.

Dear Mr. Coupal:

Your Mr. George A. Ballan was in our office this morning in response to inquiry relative to procedure to obtain reclassification on some of our young men at the mine. It appears that we are one of those lost children who are not fortunate to be classified by Washington along with the big sixteen, allowing critical status. Therefore, it would appear that we have no recourse to have our young men under 26 exempted. This, you can understand, will certainly create a considerable handicap in our operations.

We expect to have our Leaching Plant in operation around the first of the month and will need all the help we can get our hands on.

I understand from our Mine Superintendent that one of our men has just been classified to 1-A, and I am asking them to forward his name, his board number, and his classification to you so that prompt action might be taken to have this man reclassified.

After talking with Mr. Ballan, I find that a man under 22 will not be considered for reclassification; therefore, should this man whom I refer to be under 22, you will not be troubled with it further. But anything you may do to have us put on the critical list along with the big sixteen will certainly be greatly appreciated.

A copy of this letter is going to our Mine office at Kingman, who will contact you direct giving you the necessary data in accordance with the above.

Very truly yours,

EMERALD ISLE COPPER CO.

By C. L. Short
C. L. Short

CLS:dm

CC: to Mr. O. E. Clewell,
Kingman, Arizona.

4 of

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Date: 3/14/45

Name of Mine: Emerald Isle

Owner or Operator: James Depoe

Address: Chloride Ariz

Mine Location: 20 Miles north of Kingman Ariz

Filing Information

File System:

File No.:

This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production X; Development ; Financing ; Sale of mine ;

Experimental (sampling) ; Owner's occasional trip ;

Other (specify)

PRODUCTION: **Past and Future.**

	Tons
Approx. tons last 3 months	
Approx. present rate per 3 months	
Anticipated rate next 3 months	
If in distant future check (X) here	

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars			
Light or Service Trucks	one	600	50
Ore Hauling Trucks			
Compressors			
Other Mine or Mill Eqpt.			

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

Copper

REMARKS:

Important Producer of Copper
This recommendation should be made to obtain both an ODT certificate and the necessary gas to operate it

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By Chas H Blenney

Emerald Isle File (Mohave)

TUCSON, Ariz. -(Dow Jones)- Arimetco International Inc., a Toronto-based mining company, said its Arimetco Inc. unit has filed for reorganization under Chapter 11 of the U.S. Bankruptcy Code.

The company said its U.S. unit has experienced "serious production problems" for the past six months at its Yerington Mine in Lyon County, Nevada, that resulted in lower output and higher operating costs.

Arimetco owns and operates two copper mines in the western U.S.

The company said the Chapter 11 filing will allow Arimetco Inc. the time required to solve its production problems and to reorganize its financial affairs. The U.S. unit will continue to operate its business as debtor in possession.

Transmitted: 1/3/97 2:34 PM (L100PGtE)

C O P Y O F

R E P O R T

by

THE GENERAL ENGINEERING COMPANY

Lot No. 1978

Test 1 to 13 inc.

L RTMENT OF MINERAL RESOURCES
State of Arizona
FIELD ENGINEERS REPORT

S P E C I A L

Mine: EMERALD ISLE ✓

Date 10/3/39

District: Mineral Park, Chloride, Ariz.

Engineer: Elgin B. Holt

Subject: Synopsis Report

Property located 3 miles southerly from Chloride, in the flats well to the west of the Cerbat foot hills.

I visited this property on October 3, 1939, and was well pleased with it, in that it seems to have the largest ore reserves indicated over any other mine in the Chloride District, now available for milling.

Geology consists of a surface bed of conglomerate from 60 to 100 feet thick, impregnated with copper silicate over a considerable area. Under the conglomerate the country rock is Pre-Cambrian granite complex rocks.

A copper bearing vein from 5 to 7 feet wide cuts both the conglomerate and the granite underneath. This vein has been opened by a shaft 100 feet deep as well as by 1,600 feet of drifts and cross cuts. The vein ore runs considerably higher than the conglomerate ore beds above the granite mentioned.

I was furnished the following data concerning this property by R. C. Jacobson, Assayer & Chemist, of Kingman. In 1917-18 Jacobson and associates installed a 50-ton test leaching & electrolytic plant on property and made a recovery of copper values of better than 95%. It required 100 lbs. of concentrated sulphuric acid to leach a ton of ore containing 50 lbs. of copper. This plant was being operated successfully, notwithstanding high electric power costs, until the close of the World War and the consequent slump in copper caused operations to cease. In carrying out this operation, Jacobson milled 13,000 tons of ore from a surface quarry that produced net 50 lbs. of copper per ton of ore treated. Ore was crushed to 3/4 inch mesh before being placed in leaching vats; hence fine grinding was found to be unnecessary.

The conglomerate ore bed, which as stated is from 60 to 100 feet thick, has been proven by test pits to have an area on the surface of 161,850 square feet. Assuming an average depth of the conglomerate to be 60 feet, each square feet of surface would contain 4 tons of ore underneath. This would give 647,400 tons of ore, averaging 2.38% copper. Average of 120 samples underground, gave 3.36% copper. Jacobson says future development of surface conglomerate area should yield an additional 500,000 tons of ore, making over 1,000,000 of indicated ore, which could be broken by surface pit mining and removed by power shovels.

In 1917 a composite sample of 900 tons from the surface quarry gave the following analysis:

Cu	Fe	Mn	Al	CaO	Insol
2.43%	2.6%	2.56%	3.26%	0.06%	84.6%

Owners of Property: Mrs. Edith Downey, Los Angeles, California.

Property now said to be under option to: Ogden C. Chase, Kingman, Arizona.

3. Leaching time for 20 mesh material is six hours when acid strength of solutions is maintained at 10 to 25 lbs. of H_2SO_4 per ton. Relative leaching period and recovery recoveries were not determined for sizes between 20 mesh and 3 inches.

4. Copper extractions in excess of 90% are readily obtained on all sizes of material up to 1/4", 87% on material between 1/4" and 1/2", and only 31.7% on material over 1" in size.

5. Iron consumption for the precipitation of copper from solutionsused for leaching single batchesof ore does not exceed 1.1 lbs. per pound of copper.

DISCUSSION

Acid Consumption

The small amount of acid consumed by the gangue in the leaching of this ore is not effected to any serious extent over the wide range of conditions covered by the test work. When figured on the basis of copper dissolved, the acid consumption will vary, because of the gangue consumption which remains fairly constant, with the variations in copper extraction, but as shown in the tests (No. 12 with a 90% copper extraction) 10 to 25 lbs, acid strength of solutions and a leach period up to 18 hours, the consumption does not exceed 2.5 lbs. of acid per pound of copper, and in several tests the consumption was around 2 lbs. of acid per pound of copper. Higher acid strengths cause higher gangue consumption of acid and relatively higher per pound of copper acid consumption.

In addition to the acid consumption shown for leaching operation, there will be some consumption when precipitating with iron, and some mechanical losses. The loss indicated in precipitation (Table No. 7) is low, but this might be increased slightly if solutions are re-circulated and also thru the necessary bleeding of solutions to waste for the control of ferrous and ferric iron in the solution.

Acid Strength of Solutions

High acid strengths of 50 to 100 pounds H_2SO_4 per ton of solution accelerate copper dissolution, but also increase gangue consumption slightly and present a problem of sending high acid solutions to precipitation. A cyclic test (5 batches) was made to carry out counter-current leaching operations in which high acid solutions (100 lbs. H_2SO_4 per ton) were used. The leach solution from the first batch of ore was progressively used on 4 similar batchesof fresh ore for the purpose of building up the copper content and obtaining a corresponding decrease in acid strength. Results of this test (No. 10) were very erratic and are not included in the attached tabulation for this reason. Acid strengths varied up and down without apparent reason and during these changes it was found that the percentage of copper in solution also varied, particularly as the acid strength dropped there was a noticeable drop of copper in the solutions.

Percolation rates dropped off rapidly during the tests, and in our judgment the erratic results were due to the action of the high acid solutions upon the alumina in the ore.

The rate of copper dissolution drops off rapidly when the strength of acid goes below 8 to 10 pounds of free acid per ton of solution, and it does not appear practical to attempt to neutralize the leach solutionsbelow this strength ahead of precipitation.

LEACHING TIME

Strength of acid solutions determine to a large extent, the time of leaching required

for material under 1/4" in size. On plus 1/4" material the size becomes the determining factor as shown in Test No. 13, Table No. 6.

Because of the difficulties encountered when using the higher strength solutions, the leaching time should be considered in relationship to the lower acid strengths. In test No. 12, the acid strength was maintained within a 10 to 20 pound range, which we believe to be desirable, and at the end of 6 hours leaching of minus 20 mesh material, 89.29% of the copper was dissolved.

In the leaching test on the minus 3" material, only 31.7% of the copper contained in the plus 1" material was dissolved at the end of 21 days of leaching as shown in table No. 6. Time of leaching for materials crushed to pass intermediate screen sizes was not determined and it is the purpose of this table only to show the recovery of copper in the different size fractions at the end of 21 days. It does not mean, for example that 21 days will be required to obtain an 87.3% extraction of copper when leaching material that is minus 1/2". In such a case the minus 1/2" plus 1/4" fraction would represent only a portion of the entire lot and it would therefore be expected that a shorter leach period would give a satisfactory extraction with a shorter leach period. This table, however, does show that relatively short leaching periods will not produce satisfactory recoveries on material over 1/2" in size.

IRON CONSUMPTION

The procedure used for determining iron consumption in precipitation is outlined and accompanies table No. 7. The iron consumptions shown in this table do not represent the total consumption that will take place in actual operations and some allowance must be made for impurities in the iron used commercially as well as mechanical losses that will occur.

GENERAL

Upon receipt of the sample of ore on which tests were made, a portion of the sample was removed by quartering and crushed to all minus 20 mesh. A head sample was cut from this portion for assay and this contained 2.04% copper. Calculated heads of tests on the 20 mesh material varied up to 2.12% copper. The heads for Test No. 13 were obtained by quartering and a similar portion was likewise obtained for assay of size fractions as shown in table No. 6. The calculated head of test No. 13 (solution assay x weight + tails assay x weight) is 2.46% Copper and the assay head of the portion used for size fraction assays is 2.23% copper. These variations can only be accounted for thru inaccuracies of sampling a relatively small lot of material at the size of material as received.

We will be pleased to discuss further any points regarding which you might have questions in connection with the tests completed.

Yours very truly,

THE GENERAL ENGINEERING COMPANY

Signed: By - J. H. Heginbotham, Manager.

JHHmo

EMERALD ISLE COPPER COMPANY

LOT No. 1978 (Open Cut)

COPPER LEACH TESTS

TESTS 1, 2, 3, & 4 - LEACHING BY AGITATION

SCOPE - To determine acid consumption and copper dissolution when using leach solutions of varying acid strengths.

TEST CONDITIONS - Other than the difference in acid strengths noted, all tests conditions of this series were the same, and included:

Crushing: All samples used were crushed to minus 20 mesh.

Wt. of Samples: 1000 grams each (equal portions)

Agitation dilution: 1.5 parts solution to 1 part ore by weight.

Agitation period: 2 hours for all tests.

TEST RESULTS

TABLE No. 1

Test No.	Pounds H_2SO_4 per ton of solution Start	Finish	H_2SO_4 consumption Lb. Cu	Ton Ore	Assay % Cu Per ton solution	Tailings assay Percent Copper	% Copper Recovery in Solution	Calculated Heads
1	78	27.2	1.97	76.2	1.29	* 0.16	93.19	* 2.095
2	96	43.0	1.995	79.6	1.33	* 0.1	95.22	* 2.095
3	117	60.6	2.102	84.5	1.34	* 0.08	95.94%	* 2.095
4	137	81.9	2.07	82.6	1.33	0.10	95.22	* 2.095

* Denotes calculated assays.

REMARKS

1. Acid consumption per pound of copper is based on copper recovered.
2. Acid consumption is for leaching operation only and does not include any precipitation or mechanical consumption or loss.

(Calculated on basis of 1500 grams solution
980 grams tails.)

EMERALD ISLE COPPER COMPANY
LOT No. 1978 (Open Cut)
COPPER LEACH TESTS (Continued)

TESTS 5, 6 & 7 - LEACHING BY AGITATION

SCOPE - To determine rate of copper dissolution when using fixed acid strength of leach solutions.

TEST CONDITIONS - All test conditions of this series were the same, except for varying periods of leaching time as noted:

Crushing: All samples used were crused to minus 20 mesh.
Wt. of samples: 1000 grams each (equal portions)
Agitation Dilution: 1.5 parts solution to 1 part ore by weight.

TEST RESULTS

TABLE No. 2

Test No.	Agitation Time	Pounds H_2SO_4 per ton of solution		H_2SO_4 Consumption		Assay Percent Copper per ton Solution	Tailings Assay % Copper	% Copper Recovery in Solution	Calculated Heads
		Start	Finish	Lb. Cu	Ton Ore				
5	15 Min.	100	48.8	2.01#	76.8 #	1.27	* 0.21	90.5	* 2.123
6	60 Min.	100	45.2	2.01	82.1	1.32	* 0.146	93.2	* 2.123
7	4 hrs.	100	41.3	2.17	88.0	1.35	0.10	95.3	* 2.123

* Denotes Calculated Assays

REMARKS

1. Acid consumption per pound of copper is based on copper received.
2. Acid consumption is for leaching operation only and does not include any precipitation or mechanical consumption or loss.

EMERALD ISLE COPPER COMPANY

LOT No. 1978 (Open Cut)

COPPER LEACH TESTS (CONTINUED)

TESTS 8 & 9 - LEACHING BY AGITATION

SCOPE :- To determine the effect of lower acid strengths of leach solutions on rate of copper dissolution.

TEST CONDITIONS: - All test conditions of this series were the same except varying acid strengths as noted:

Crushing: All samples crushed to minus 20 mesh

Weight of Samples: 1000 grams each (equal portions)

Agitation Dilution: 1.5 parts of solution to 1 part ore by weight.

TEST RESULTS

TABLE No. 3.

Test No.	Agitation Time	Pounds H_2SO_4 per ton of solution Start	Finish	H_2SO_4 Consumption Lb. Cu	Ton Ore	Assay Percent Copper per ton Solution	Tailings Assay % Copper	% Copper Recovery In Solution	Calculated Heads
8	15 min.	50.0		3.01	74.1	0.83	0.875	58.7	2.12
9	15 min.	38.5		3.0	57.15	0.64	1.16	45.3	2.12

EMERALD ISLE COPPER COMPANY

LOT No. 1978 (Open Cut)

COPPER LEACH TESTS (Continued)

TESTS 11 & 12 - LEACHING BY AGITATION

SCOPE - To determine effect of low acid strengths of 25 lbs. per ton of solution on leaching time.

TEST CONDITIONS - Test No. 11 was agitated with 4 parts of solution containing 25 lbs. H_2SO_4 per ton of solution to 1 part of ore; no additional acid was added.

Test No. 12 was agitated with 1½ parts solution containing 25 lbs. H_2SO_4 per ton of solution to 1 part of ore. Acid was added throughout the test to keep the acid strength up over 10 lbs. H_2SO_4 per ton of solution. All other conditions were similar

Crushing - Both test charges crushed to minus 20 mesh
Weight of Samples - 500 grams each

TEST RESULTS

TABLE No. 4

TEST No. 11 - 4 to 1 Dilution

Agitation Time	Free H_2SO_4 per ton sol'n	% Copper per ton solution	% Copper Recovery in Sol'n.
1 hour	-	0.30	58.8
2 hours	6.26	0.323	65.4
8 hours	5.52	0.329	64.6
18 hours	5.60	0.365	71.4

Final tailing assay 0.64% copper
Acid consumption per ton of ore - 76.3 lbs.
Acid consumption per lb. copper recovered 2.5#
Calculated Heads - 2.12% copper

TEST NO. 12 - 1.5 to 1 dilution

Agitation Time	Free H_2SO_4 per ton solution	% Copper per ton Solution	% Copper Recovery in Solution
1 hour	4.6	0.361	27.02
2 hours	10.30	0.701	51.58
4 hours	15.31	0.961	70.66
6 hours	13.96	1.214	89.29
18 hours	16.27	1.353	90.56

Final tailing assay - 0.20% copper
Acid consumption per ton of ore - 95.27 lbs.
Acid consumption per lb. of copper recovered-2.45#
Calculated Heads - 2.12% Copper

EMERALD ISLE COPPER COMPANY

LOT No. 1978 - (Open Cut)

COPPER LEACH TESTS (Continued)

TEST No. 13 - TRICKLE LEACHING OF MINUS 3 INCH MATERIAL

TEST CONDITIONS - A 10,000 gram portion of the sample received was obtained for this test by quartering. This portion which was all minus 3" was placed in a glass leaching vat with solution distributor for trickle leaching. Solutions were circulated by means of a small stainless steel pump.

TEST RESULTS

TABLE No. 5

Leaching Time	Free H_2SO_4 per ton solution	H_2SO_4 Consumption Per Lb.Cu	H_2SO_4 Consumption Per Ton Ore	Assay Percent Copper Per ton Solution	Percent Copper Recovery in Solution
Start	22.0	-	-	-	-
12 hours	7.5	2.24	29.0	0.340	26.2
1 Day	5.4	2.33	33.2	0.375	28.9
1½ days	5.3	2.17	31.4	0.380	29.3
2 days	5.1	2.30	33.8	0.385	29.7
2½ days	4.2	2.35	35.6	0.397	30.6
3 days	4.2	2.35	35.6	0.397	30.6
NEW SOLUTION STARTED					
3 days	19.8	-	-	-	-
3½ "	17.5	2.26	40.02	0.076	36.1
4 "	14.0	2.47	47.2	0.112	38.7
4½ "	12.7	2.35	49.8	0.172	43.0
5 "	11.3	2.37	52.6	0.20	45.0
5½ "	9.8	2.38	55.8	0.232	47.3
6 "	9.6	2.37	56.0	0.240	47.9
10 "	9.2	2.25	56.8	0.285	51.1
11 "	8.7	2.29	57.8	0.285	51.1
12 "	8.7	2.29	57.8	0.285	51.1
NEW SOLUTION STARTED					
12 days	18.5	-	-	-	-
13 "	16.0	2.28	62.8	0.062	55.7
14 "	13.1	2.40	68.6	0.093	57.8
15 "	13.5	2.32	67.8	0.112	59.2
16 "	12.1	2.28	70.6	0.160	62.6
18 "	11.8	2.28	71.2	0.168	63.2
19 "	11.7	2.28	71.4	0.172	63.5
20 "	11.5	2.28	71.8	0.177	63.8
21 "	11.5	2.28	71.8	0.177	63.8

FINISH

EMERALD ISLE COPPER COMPANY

LOT No. 1976 - (Open Cut)

LEACHING TEST No. 13 (Continued)

TEST No. 13 Continued

Total Copper Extraction - 63.8%
Total Acid consumption per ton of ore - 71.8 lbs.
Total Acid Consumption per pound copper dissolved - 2.28lbs.
Ratio of solution to ore - 6 to 1
Calculated Head Assay - 2.46% Copper.

Tailings from this test were washed and sized; each size fraction being assayed separately for copper. These assays show the distribution of copper remaining in the tails and are tabulated below together with similar assays feed size fractions.

TABLE No. 6

Product	Percent Weight	Percent Copper (Assay)	Percent Distribution of Copper	Percent Copper Recovery of each fraction
FEED				
Plus 1 inch	52.3	2.25	52.7%	-
Minus 1" Plus 1/2"	16.2	1.84	13.4	-
Minus 1/2" plus 1/4"	9.8	1.66	7.3	-
Minus 1/4" plus 20 M	15.1	1.90	12.8	-
Minus 20 mesh	6.6	4.66	13.8	-
Heads	100.0	2.23	100.0	-
TAILINGS				
Plus 1"	52.9	1.56	88.2	31.7%
Minus 1" plus 1/2"	9.6	0.52	5.3	71.7
Minus 1/2" plus 1/4"	8.4	0.21	1.9	87.3
Minus 1/4" plus 20 M	18.9	0.13	2.6	93.2
Minus 20 mesh	10.2	0.18	2.0	96.1
Total	100.0	0.94	100.0	63.8

EMERALD ISLE COPPER COMPANY

LOT 1978 - (Open Cut)

PRECIPITATION OF COPPER FROM SOLUTIONS

TREATMENT

The copper bearing solutions were assayed for copper, iron and free-acid. A measured volume of these solutions were placed in a flask and an excess of iron added. The solutions were permitted to stand for 20 minutes. The iron was then filtered off. The copper and iron content of the precipitated solutions were then determined. The results were as follows:

RESULTS

TABLE No. 7

Before Precipitation				After Precipitation			
Sample No.	Percent Copper	Percent Iron	Free acid pounds per ton solution.	Percent Copper	Percent Iron	Free acid Pounds per Ton Solution	Ration of Iron consumed per Lb. Cu precipitated.
1	0.84	Trace	4.6	Trace	0.84	3.50	1.
2	1.17	"	10.2	"	1.23	3.29	1.05
3	1.08	"	11.67	"	1.08	4.56	1
4	1.89	"	20.6	"	1.90	8.26,	1
5	1.61	"	22.0	"	1.53	9.26	0.95
6	0.49	"		"	0.52	0.48	1.06
7	0.27	0.044	1.12	"	0.31	None	1.0

Feasibility Study by Robert L. Clayton, Consulting Geologist of Tucson. He is retained by Alta Exploration, a Reno NV based company.

EMERALD ISLE MINE
Mohave County, Arizona
Copper in Situ Leaching Operation
10-5-83

K

DCFROR 16%

	0	1	2	3	4	5
Lbs. Copper		270,000	1,664,500	1,664,500	1,664,500	644,350
Gross Value (0.70/lb)		189,000	1,165,200	1,165,200	1,165,200	451,000
Royalty 6%		11,300	69,900			27,100
Sales Tax 1½%		2,800	17,800			6,800
Operating Cost (0.44/lb.)		118,800	732,400			283,500
Interest		–	–	–	–	–
Total Cost		132,900	820,100			317,400
Net Income Before Taxes		56,100	345,100			133,600
Pre-Production Capital Cost	615,700					
Acquisition Cost	100,000					
Depreciation (unit of Production -0.1211/lb.)		32,700	201,600			78,000
Income Before Depletion		23,400	143,500			55,600
50% Limit		11,700	71,800			27,800
% Depletion (15%)		28,400	174,800			67,700
Taxable Income		11,700	71,800			27,800
40% Tax		4,700	28,700			11,100
Net Profit		7,000	43,100			16,700
+Depreciation		+32,700	+201,600			+78,000
+Depletion		+11,700	+71,800			+27,800
Cash Flow		51,400	316,500	316,500	316,500	122,500
Accumulative	(715,700)	(657,100)	(340,600)	(24,100)	292,400	414,900

PARAMETERS

590,785 Tons @ 1% Copper
50% Recovery
5,907,850 Lbs. Copper
420 gpm @ 1 gpl @ 90% Recovery
4500 Lbs. Copper Production Per Day
4.3 Year Operation
Copper Sold As Copper Cathode
Price @ 0.71 -0.01 for Freight
Used Equipment as Per Cost Distribution
All Construction To Be "In House"

EMERALD ISLE MINE
Mohave County, Arizona
Copper in Situ Leaching Operation
10-5-83

DCFROR 24%

	0	1	2	3	4	5
Lbs. Copper		270,000	1,664,500	1,664,500	1,664,500	644,350
Gross Value (0.75/lb.)		202,500	1,248,400			483,300
Royalty 6%		12,200	74,900			29,000
Sales Tax 1½%		3,000	18,700			7,200
Operating Cost (0.44/lb.)		118,800	732,400			283,500
Interest		-	-	-	-	-
Total Cost		134,000	826,000			319,700
Net Income Before Taxes		83,700	422,400			163,600
Pre-Production Capital Cost	615,700					
Acquisition Cost	100,000					
Depreciation (unit of Production -0.1211/lb.)		32,700	201,600			78,000
Income Before Depletion		51,000	220,600			85,600
50% Limit		25,500	110,400			42,800
% Depletion (15%)		30,400	187,300			72,500
Taxable Income		25,500	110,400			42,800
40% Tax		10,200	44,200			17,100
Net Profit		15,300	66,200			25,700
+Depreciation		+32,700	+201,600			+78,000
+Depletion		+25,500	+110,400			+42,800
Cash Flow		73,500	378,200	378,200	378,200	146,500
Accumulative	(715,700)	(642,200)	(264,000)	114,200	492,400	638,900

PARAMETERS

590,785 Tons @ 1% Copper
50% Recovery
5,907,850 Lbs. Copper
420 gpm @ 1 gpl @ 90% Recovery
4500 Lbs. Copper Production Per Day
4.3 Year Operation
Copper Sold As Copper Cathode
Price @ 0.76 -0.01 for Freight
Used Equipment as Per Cost Distribution
All Construction To Be "In House"

EMERALD ISLE MINE
Mohave County, Arizona
Copper in Situ Leaching Operation
10-5-83

DCFROR 37%

	0	1	2	3	4	5
Lbs. Copper		270,000	1,664,500	1,664,500	1,664,500	644,350
Gross Value (0.85/lb.)		229,500	1,414,800			547,700
Royalty 6%		13,800	84,900			32,900
Sales Tax 1½%		3,400	21,200			8,200
Operating Cost (0.44/lb.)		118,800	732,400			283,500
Interest		-	-	-	-	-
Total Cost		136,000	838,500			324,600
Net Income Before Taxes		93,500	576,300			223,100
Pre-Production Capital Cost	615,700					
Acquisition Cost	100,000					
Depreciation (unit of Production -0.1211/lb.)		32,700	201,600			78,000
Income Before Depletion		60,800	374,700			145,100
50% Limit		30,400	187,400			72,600
% Depletion (15%)		34,400	212,200			82,200
Taxable Income		30,400	187,400			72,600
40% Tax		12,200	75,000			29,000
Net Profit		18,200	112,400			43,600
+Depreciation		+32,700	+201,600			+78,000
+Depletion		+30,400	+187,400			+72,600
Cash Flow		81,300	501,400	501,400	501,400	194,200
Accumulative	(715,700)	(634,400)	(118,100)	398,200	914,500	1,108,700

PARAMETERS

590,785 Tons @ 1% Copper
50% Recovery
5,907,850 Lbs. Copper
420 gpm @ 1 gpl @ 90% Recovery
4500 Lbs. Copper Production Per Day
4.3 Year Operation
Copper Sold As Copper Cathode
Price @ 0.86 -0.01 for Freight
Used Equipment as Per Cost Distribution
All Construction To Be "In House"

EMERALD ISLE MINE

Mohave County, Arizona
Copper in Situ Leaching Operation
10-5-83

DCFROR 47%

	0	1	2	3	4	5
Lbs. Copper		270,000	1,664,500	1,664,500	1,664,500	644,350
Gross Value (0.95/lb.)		256,500	1,581,300			612,100
Royalty 6%		15,400	94,900			36,700
Sales Tax 1½%		3,800	23,700			9,200
Operating Cost (0.44/lb.)		118,800	732,400			283,500
Interest		–	–	–	–	–
Total Cost		138,000	851,000			329,400
Net Income Before Taxes		118,500	730,300			282,700
Pre-Production Capital Cost	615,700					
Acquisition Cost	100,000					
Depreciation (unit of Production -0.1211/lb.)		32,700	201,600			78,000
Income Before Depletion		85,800	528,700			204,700
50% Limit		42,900	264,400			102,400
% Depletion (15%)		38,500	237,200			91,800
Taxable Income		47,300	291,500			112,900
40% Tax		18,900	116,600			45,200
Net Profit		28,400	174,900			67,700
+Depreciation		+32,700	+201,600			+78,000
+Depletion		+38,500	+237,200			+91,800
Cash Flow		99,600	613,700	613,700	613,700	237,500
Accumulative	(715,700)	(616,100)	(2,400)	611,300	1,225,000	1,462,500

PARAMETERS

590,785 Tons @ 1% Copper
50% Recovery
5,907,850 Lbs. Copper
420 gpm @ 1 gpl @ 90% Recovery
4500 Lbs. Copper Production Per Day
4.3 Year Operation
Copper Sold As Copper Cathode
Price @ 0.96 -0.01 for Freight
Used Equipment as Per Cost Distribution
All Construction To Be "In House"