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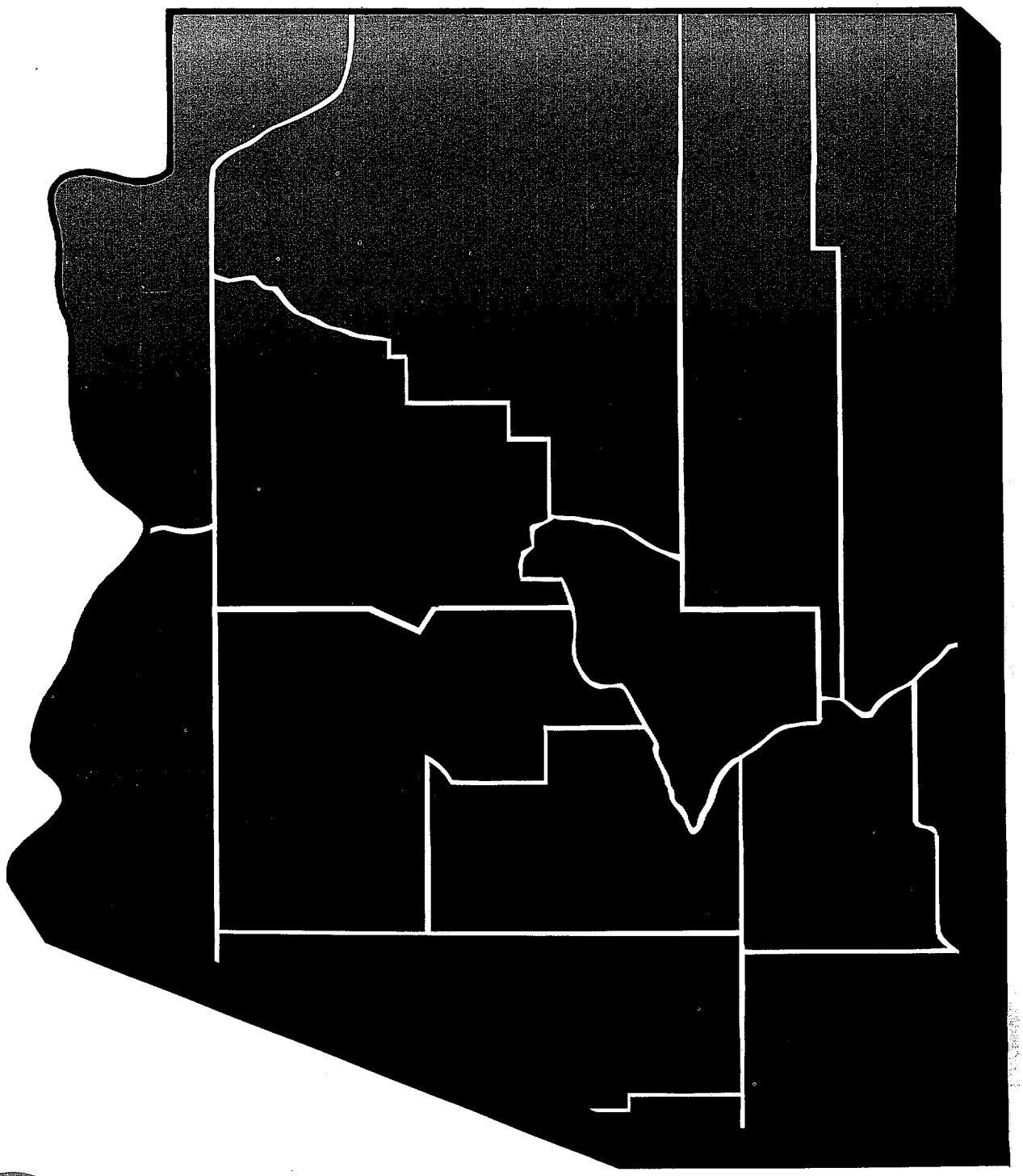
# ARIZONA

## COPPER CAPITAL, U.S.A.




ARIZONA MINING ASSOCIATION

100 WEST CLARENDON, SUITE 1720 • PHOENIX, ARIZONA 85013 • TELEPHONE: (602) 266-4416

## ABOUT THE COVER

The copper mines and facilities listed below correspond to the location and numbers appearing on the cover. The following abbreviations are used to indicate the type of mining operations employed and facilities located at the various sites in 1978.

UG - Underground mine and mill
OPM - Open pit and mill
OP - Open pit only
L - Leaching
CC - Cement copper operations
EC - Electrowinning cathode plant
ER - Electrolytic refinery
RP - Copper rod fabricating plant
MO - Molybdenum processing plant
H - Hydrometallurgical plant
A - Sulfuric acid plant

ANAMAX MINING COMPANY
1 Twin Buttes Mine(OPM-EC-MO)
2 Eisenhower Mine-Partner(OP)

ASARCO INCORPORATED
3 Smelter at Hayden(A)
(2) Eisenhower Mine-Partner(OP)
4 Mission Unit(OPM-MO)
4 San Xavier Unit:
San Xavier North Mine(OP-L-CC)
San Xavier South Mine(OP-L-CC)
5 Silver Bell Unit:
El Tiro & Oxide Pits(OPM-L-CC-MO)
6 Sacaton Unit(OPM-UG Development)

CASA GRANDE COPPER COMPANY
7 UG Project (in planning)

CITIES SERVICE COMPANY
8 Pinto Valley Operations(OPM-MO)
8 Miami Unit(L-EC)
8 Miami East (UG Development)
8 Copper Cities(OP-L)

CYPRUS MINES CORPORATION
9 Cyprus Bagdad Copper Co.
Bagdad Mine(OPM-L-EC-MO)
10 Cyprus Johnson Copper Co.
Johnson Mine(OP-L-EC)

CYPRUS PIMA MINING COMPANY
11 Pima Mine(OPM-MO)

DUVAL CORPORATION
12 Mineral Park Mine(OPM-L-CC-MO)
13 Esperanza Mine(OPM-L-CC-MO)
13 Sierrita Mine(OPM-MO-H)

INSPIRATION CONSOLIDATED COPPER CO.
14 Smelter at Inspiration(A)
14 Oxhide Mine(OP-L)
14 Thornton & Live Oak Pits(OPM-L-CC-EC-ER-RP-MO)
15 Christmas Mine(OPM)

KENNECOTT MINERALS COMPANY
16 Smelter at Hayden(A)
16 Ray Mine(OPM-L-CC-Two EC's-MO)

MAGMA COPPER COMPANY
17 Superior Division:
Magma Mine(UG)
18 San Manuel Division:
San Manuel Mine(UG-ER-RP-MO)
Smelter at San Manuel(A)

McALESTER FUEL COMPANY
19 Zonia Mine(L-CC)

NORANDA LAKESHORE MINES, INC.
20 Lakeshore Mine (UG-L-CC-EC-A)

PHELPS DODGE CORPORATION
21 New Cornelia Branch:
New Cornelia Mine(OPM)
Smelter at Ajo(A)
22 Copper Queen Branch(L-CC)
23 Smelter at Douglas
24 Safford Project(UG Development)
25 Morenci Branch:
Morenci Mine(OPM-L-CC)
Metcalf Mine(OPM-L-CC)
Smelter at Morenci(A)

RANCHERS EXPLORATION & DEVELOPMENT CO.
26 Bluebird Mine(OP-L-EC)
27 Old Reliable(OP-L)

# ARIZONA:
# COPPER CAPITAL, U.S.A.
# 1978

Prepared by

The Arizona Mining Association

Phoenix, Arizona

October 1979

*NOTE: This report is an annual publication of The Arizona Mining Association. Its purpose is to acquaint interested people with the economic impact that the copper industry has on the State of Arizona.*

*This edition reflects statistical data for the year 1978. Much of this data is not available until later the following year. Thus, to present an accurate and complete analysis, the report is published at this time.*

*The President's message on the following page, however, discusses current events of the industry as well as a brief summary of 1978.*

ARIZONA MINING ASSOCIATION

100 WEST CLARENDON • SUITE 1720 • PHOENIX, ARIZONA 85013 • (602) 266-4416

J. K. RICHARDSON
President

October 30th, 1979

1978 reflected only minimally upon the difficult cost-price squeeze which has for years faced the mining segment of the copper industry of the United States. The most encouraging trend that began to emerge at year end was an improvement in price. At the beginning of 1978 the price was 62¢ a pound which advanced to 71¢ in December. This trend continued into the current year (1979) which saw prices increase to over a dollar a pound. This improvement can, largely, be laid at the door of a decrease in copper imports. These decreases were the result of labor difficulties, civil war, transportation breakdowns and energy shortages in competing copper producing nations. The producer copper inventories were rapidly depleted and fabricator stocks virtually disappeared overnight as world copper stocks dropped.

During 1978's regular legislative session we had strongly urged broad tax reform to assist Arizona's copper mining industry overcome its loss position of the past several years. Our position was taken, in view of massive layoffs, production curtailments, rising costs of regulatory compliance and growing concern over the industry's economic well being. The legislative leadership, as well as the Governor, felt that such broad reform in the regular session was impossible to achieve and interim relief was considered more feasible pending the special session contemplated for 1979.

The interim legislation granted was in the form of a 2-year suspension of one-half percent of the existing 2-1/2% severance tax. The mining industry, in general, found this acceptable as interim relief.

There continues to be a strong indication that there is a shortage of high quality copper, common to Arizona, on a world wide basis. Sight, however, cannot be lost of the market pressures exerted by foreign governmental owned or controlled copper interests competing with our own. Another cloud appearing on the horizon which has tended to weaken prices is the fact that in July 1979 there has been noted a decrease in consumption, production, coupled with a buildup in industrial stocks.

1979, so far, has been a year in which our Arizona copper industry has recouped some of its earlier losses. We are hopeful that this trend will continue but the threat of a national recession cannot help but make buyers of copper wary.

As we view this year of 1979 we must remember the old adage, "One robin does not make a spring." One year of favorable price in no way overcomes the four depressed years just past!

Sincerely,

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# ARIZONA'S COPPER INDUSTRY - MADE GREAT BY ARIZONANS

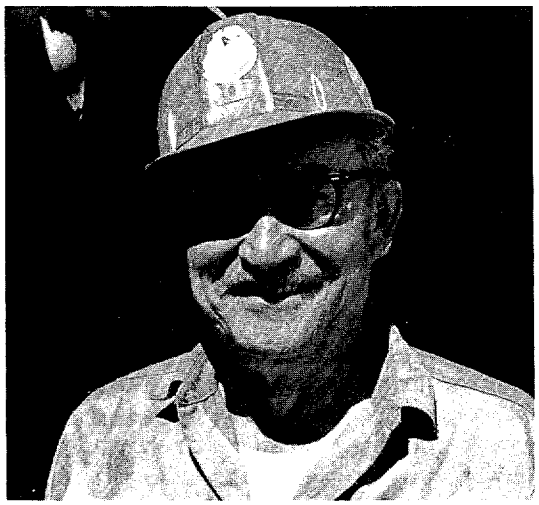
THESE ARIZONANS REPRESENT A TYPICAL CROSS SECTION OF OVER 23,000 EMPLOYEES THAT MAKE THE COPPER INDUSTRY A MAJOR CONTRIBUTOR TO ARIZONA'S ECONOMY.

WE ARE PROUD OF THEIR ACCOMPLISHMENTS, THEIR FAMILIES AND OF THEIR COMMUNITY CONTRIBUTIONS. JUST AS THEIR PREDECESSORS HAVE DONE SINCE BEFORE 1900, THESE ARIZONANS CONTINUE BUILDING A GREAT STATE AND LIFE STYLE FOR ALL OF US.

PAUL ALANIS, 35, is the Heap Operator for the Zonia Mine of McALESTER FUEL COMPANY located at Kirkland. Paul's responsibility is to maintain the heap irrigation system for solutions circulating through the crushed ore. While the mine is in a shutdown posture, he performs maintenance and watchman duties. Paul graduated from Prescott High School and has been employed at the Zonia Mine for 10 years. He and his wife, Karen Lee, have a son and a daughter. He enjoys hunting, fishing and motorcycles.

RICHARD AMADO, 32, is a Welder at the Lakeshore Mine of NORANDA LAKESHORE MINES, INC. Richard is a graduate of Casa Grande High School and attended Welding and Diesel Automotive School at Central Arizona College. He is capable of performing all types of welding assignments either on the surface or in the underground mine. Richard has been working at the Lakeshore Mine for approximately 7 years. He and his wife, Gloria, have a daughter 8 and a son 5. Richard enjoys playing softball.

MIKE ATTAWAY, 29, is the Mine Manager and Chief Engineer of the Bluebird Mine of RANCHERS EXPLORATION & DEVELOPMENT CORPORATION. Mike, who was born in Florence, graduated from Casa Grande High School and is a mining engineer graduate from the University of Arizona. Among his interests, including hunting, fishing and collecting carbide lamps, is spelunking, the study and exploration of caves. On the job, Mike is responsible for the operations of an open pit mining operation and its related engineering functions. Mike has been with Ranchers approximately 6 years. He and his wife, Mary, have a year-old son.



JOSE P. BENAVIDEZ, 58, is a Mechanic for the ANAMAX MINING COMPANY, responsible for repairing and maintaining heavy mine mobil equipment, such as cranes, dozers, graders and various trucks. He has worked for many years in the mining industry, including 15 years with Anamax. He attended St. Anthony Elementary School in Robstown, Texas, and heavy equipment school in the U.S. Army. He and his wife, Lucy, have one son, three daughters and two grandchildren. Jose like fishing and fruit and vegetable gardening. As a true do-it-yourselfer, he built their home.

IRA B. BOURGUET, 60, holds the job title of Repairman First Class. He is responsible for pipeline and pump installations, construction of retaining walls, excavations and dams at ASARCO, INCORPORATED's Silver Bell Unit. He has been with ASARCO for 26 years, all but one at Silver Bell. His additional duties include relief foreman responsible for training and supervising surface crews in safe and efficient work practices. Ira attended Monticello High School in New Mexico. He and his wife, Rose, have 3 married children and 4 grandchildren and reside at the Silver Bell Townsite. They enjoy dancing and physical fitness.

MARY DEE BRACAMONTE, 47, holds the position of Secretary to the Controller, Ray Mines Division of KENNECOTT MINERALS COMPANY at Hayden. Mary Dee has been with Kennecott in various administrative positions for 18 years. She attended public schools in Hayden and enjoys knitting, macrame and beadwork. Her husband, Robert, the Supervisor of General Accounting, has been a Kennecott employee for 24 years. They are typical of many husband and wife teams who both work in the copper industry. The Bracamontes have a son, a daughter and 3 grandchildren.

CRUZ E. CAMPOS, 55, is Assistant Chief Accountant at the Mission Unit of ASARCO, INCORPORATED. His job is to supervise all financial and cost accounting functions required for a major open pit mining operation. He has been with ASARCO for 36 years in various capacities at many of their mining properties. He came to Tucson and the Mission Unit in 1959. Cruz was born in Fierro, New Mexico, now a ghost town, and attended school there and at Hurley. He and his wife, Lucrecia, have a son and a daughter. He is currently restoring a Model "A" Ford as a hobby.

TONY CASTANEDA, 43, is a Maintenance Supervisor for the Bluebird Mine of RANCHERS EXPLORATION & DEVELOPMENT CORPORATION. Tony has worked 15 years for Ranchers in various capacities and presently has the responsibility of supervising maintenance and preventative maintenance programs for the electrowinning, solvent extraction and leaching operations at the Bluebird Mine. Tony attended George Washington High School in Miami and Garfield High School in Los Angeles. Tony and his wife, Carol, have 3 daughters, one son and 2 grandchildren. His hobbies include fishing, hunting, wood carving and traveling.

THOMAS E. DIEHL, 63, is the Safety Supervisor for the New Cornelia Branch of PHELPS DODGE CORPORATION. He attended schools in Ajo and is a 1940 Business graduate of the University of Arizona. After serving in Europe in WW II and attaining the rank of Major, he returned to Ajo and has now completed 40 years service to his company. Since 1946, he has been instrumental in organizing Ajo's famous Christmas and 4th of July programs which traditionally bring townspeople and hundreds of former residents, children and grandchildren together to celebrate. He and his wife, Marie, have 3 daughters and 1 granddaughter.

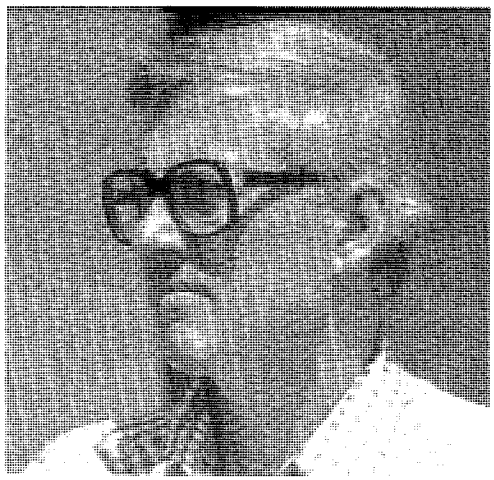
JOHN P. (JACK) GRAYBEAL, 61, is Employee Relations Coordinator for Miami Operations of CITIES SERVICE COMPANY. He is also in charge of plant protection, fire prevention and employee benefits. Jack attended Miami and Tucson High Schools and has a Public Administration degree from the University of Arizona. He and his wife, Geraldine, have a daughter and a granddaughter. His community service interests include perennial Budget Chairman of United Fund, as well as involvement in Community Television. With 40 years service, Jack is the second oldest Miami Operations employee and is also a 10-1/2 gallon Red Cross Blood Donor.

BENNIE GREENWOOD, 49, is the Crushing Plant Foreman for Ray Mines Division of KENNECOTT MINERALS COMPANY at Hayden. Bennie has been with Kennecott for 29 years, working in various capacities in the mine before assuming his present responsibilities of coordinating the movement of ore from the pit through the crushing functions. He attended Silver City High School and New Mexico Western University. He enjoys writing and singing country music (has a small country western band), fishing, hunting, boating and other outdoor recreations with his family.

MIKE N. KATICH, 63, was born and raised in Superior and has been with MAGMA COPPER COMPANY for 44 years. His experience in underground mining is extensive as he has held many positions at both Magma's Superior and San Manuel properties. During his employment he has received many safety awards and has been responsible for various production records. He currently holds the job of Chief Operational Instructor, Mine Division, at San Manuel. Mike and his wife, Mary Ruth, have 5 married daughters and they enjoy fishing and rock collecting.

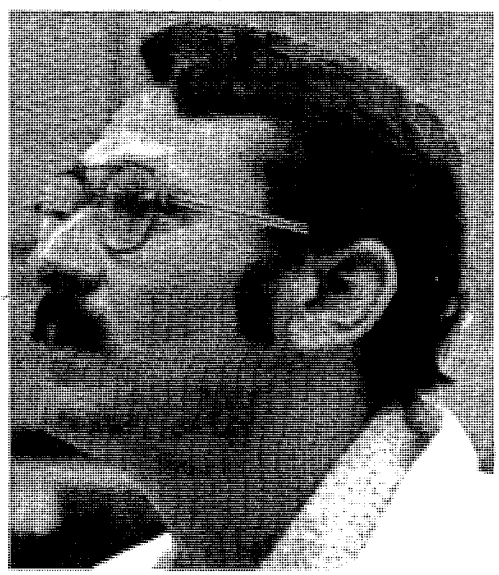
RALPH W. McKINNEY, 49, is a Shovel Operator at the DUVAL CORPORATION's Sierrita Mine. Ralph has been in mining for almost 30 years; 15 at Duval. He is no stranger to heavy equipment as he has operated many types and sizes in the past to his present mammoth 15 cubic yard electric shovel. Ralph attended high school in California and he served as a heavy equipment operator with the Navy Seabees. He and his wife, Charlotte, have 3 sons, 1 daughter and 1 grandchild. He enjoys golf and bowling.

WILLIAM GEORGE MEE, 64, has spent most of his working life in mining. Before coming to San Manuel and MAGMA COPPER COMPANY in 1956, when mining operations were just beginning, George worked in mining in South Dakota. He has held many positions in the Concentrator Department and is presently Copper Cleaner Flotation Operator, one of the key jobs in that particular department. George attended public schools in Bushnell, South Dakota, and served in the U.S. Army in WW II. He and his wife, Arlene, have 2 sons. Arlene has been the Librarian in San Manuel for many years and George enjoys salmon fishing, woodworking and beekeeping.



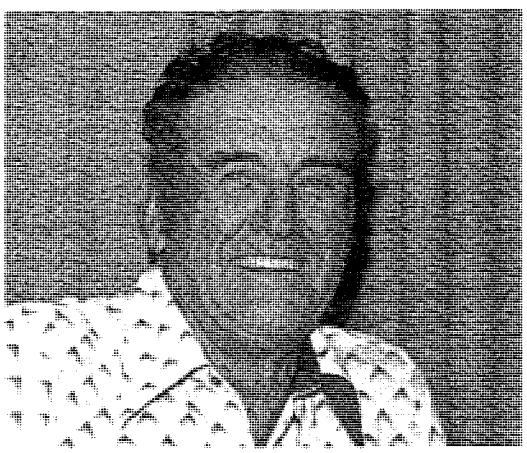
PHILIP W. NASON, 43, is Project Geologist for CASA GRANDE COPPER COMPANY and part of a professional team studying the feasibility of developing a newly discovered ore body by underground methods. Phil is a 1964 geology graduate from the University of Massachusetts and did post graduate work at the Montana School of Mines while working for a mining company in Montana. Phil and his wife, Barbara, a math teacher at Case Grande High School, have 10-year old twin sons. Phil enjoys crafts, auto machanics, jazz, camping and fishing.

JOHN E. NELSON, 33, is Senior Mine Engineer at CYPRUS BAGDAD COPPER COMPANY. John attended high school in Bagdad and is a mining engineer graduate from the University of Arizona. He has been with Cyprus 7 years and succeeds his father who also worked for Cyprus before retiring. John directs the activities of 12 other engineers and surveyors, whose responsibility it is to plan all mine work and development and to coordinate the movement of all material out of the pit. He and his wife, LaDonna, have 2 children. He enjoys hunting, fishing and rebuilding antique autos.

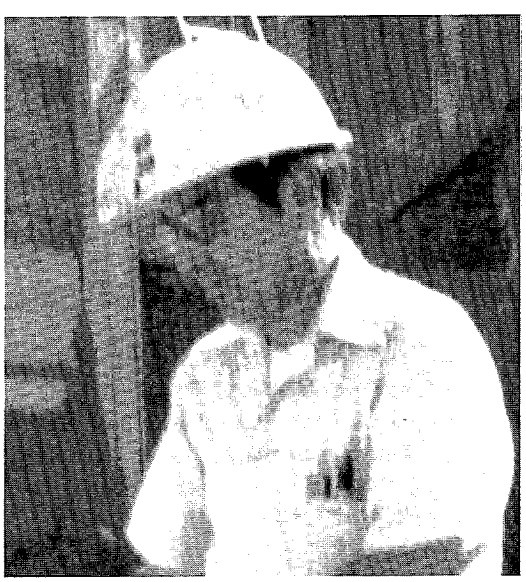


E. A. NORRIS, 43, is a Chemist and has worked at DUVAL CORPORATION's Sierrita Mine for 20 years. Although he didn't start work as a chemist, Al has advanced through many positions to his present job which includes supervision of laboratory employees with responsibility for the operation of all the sophisticated and technical equipment used in lab work. He also assumes the duties of the chief chemist during his absence. Al attended high school in Fitzgerald, Georgia, and has subsequently taken extensive courses and training in the study of chemistry. He and his wife, Mildred, have 4 children and he enjoys many outside activities and music.

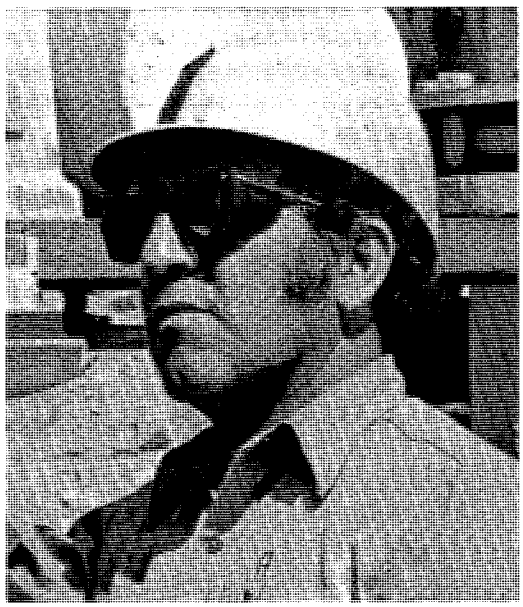
TONY P. AND MARY JANE PERKINS, ages 43 and 41 respectively, are a husband and wife team who both work for CYPRUS BAGDAD COPPER COMPANY. He is a Haulage Truck Driver and Relief Loader Operator. She is a Control Room Operator in the mill. Both have worked in various capacities at the mine prior to their present jobs and have 12 years of combined service at Bagdad. Tony attended the University of Utah and enjoys hunting and fishing. Mary Jane attended LeGrand High School in California and likes arts and crafts, music and bottle collecting. Both are presently taking additional classes at Yavapai College and enjoy prospecting. They have 5 children and reside in Signal.



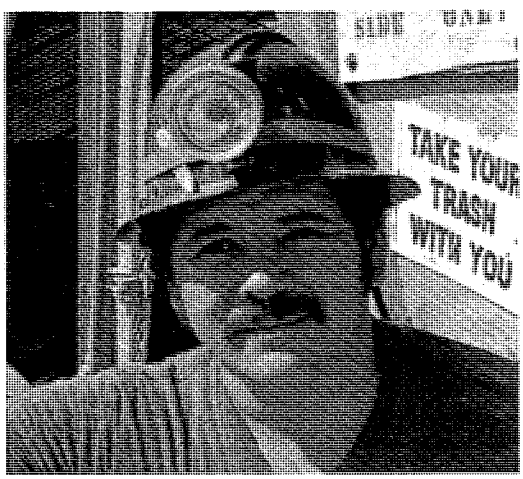
DELBERT W. RICH, 63, moved to Arizona almost 63 years ago. He attended public schools in Tempe and Gila Bend and started working in mining in 1935 in Ajo. He is presently Assistant Mine Superintendent at CYPRUS PIMA MINING COMPANY and is responsible for pit planning, training, ore control and equipment operations. Delbert and his wife, Alice, have 6 children and 14 grandchildren. He has worked with Little League and Indian League baseball and enjoys golf, bicycling and traveling.



ALBERT "COWBOY" REMOS, 53, has worked for INSPIRATION CONSOLIDATED COPPER COMPANY for 28 years. He started work in 1946 at the smelter and, after a four-year absence, returned to work on Inspiration's railroad. Later he transferred to the Leaching and Refining Department where he presently does general maintenance and works as a handyman assisting leadburners with general tank repairs. "Cowboy" and his wife, Mary, have 9 children and 3 stepchildren. He has been active for many years in the Mine, Mill and Smelter Workers Union and later the United Steelworkers of America. Presently, "Cowboy" serves as President of Local 586, USWA.



FELIPE A. RODRIGUEZ, 48, is Head Serviceman, Electrical Department of Morenci Water & Electrical Co., a subsidiary of PHELPS DODGE CORPORATION. It is his responsibility to install and maintain the power distribution systems for Morenci and Clifton area residences, and the maintenance, service and metering of pumps for the water systems. He is a graduate of Morenci High School, served in Korea and has been with Phelps Dodge for 26 years. Both he and his wife, Manuela, were born in Morenci and have 5 children. Felipe is very active in community affairs and enjoys hunting and fishing. He also has served 11 years with the Morenci Volunteer Fire Department.




FERNANDO RUIZ, 34, is an Underground Shift Boss for the NORANDA LAKESHORE MINES, INC., Lakeshore Mine. It is his present responsibility to manage an underground crew performing rehabilitation work preparatory to the reopening of the mine for the start of production. Fernando has been at the Lakeshore Mine for approximately 7 years and he enjoys prospecting as time permits. He attended schools in Eloy and Casa Grande and is presently going to Central Arizona College. He and his wife, Mary, have 2 daughters, 13 and 7, and a son aged 1.

GENE SIMS, 61, is the Leaching Plant General Foreman at INSPIRATION CONSOLIDATED COPPER COMPANY. Gene was born and raised at Inspiration and attended the local high school. He went to work for Inspiration in 1938 and has held many positions. His present responsibility is to oversee the leaching operations which include the leaching tanks, iron launders, tank repairs, electrowinning solutions and boilers. Gene and his wife, Jean, have 6 children and share a common interest in golf and bowling. Gene also has been active for many years with the Boy Scout program.

DONALD N. TREMPER, 60, has been with CYPRUS PIMA MINING COMPANY for 28 years and is presently its Treasurer. Don's responsibility is to oversee all financial functions related to cash management, accounting, reporting and planning required of a major corporation. During Don's service to his company, he has served two terms as Secretary/Treasurer of the Arizona Mining Association. He enjoys do-it-yourself projects and swimming. Don is a graduate of Tri-State College and has done extended work at the universities of DePauw, Illinois, Wisconsin and Arizona. He and his wife, Elinor, reside in Tucson.

BERNARDINO (NINO) VARELA, 60, has been with the Miami Operations of CITIES SERVICE COMPANY for 42 years and is the longest term employee of the company. Nino has worked in various capacities for the company, including laborer, truck driver and heavy equipment operator. Presently he is responsible for maintenance and service of all the company staff cars. Nino and his wife, Mickey, have 2 sons and a daughter. He was born in Metcalf, Arizona, attended Miami schools, served with the Seabees in the South Pacific and is involved in numerous community and youth activities.

DALE E. WOOD, 48, is the Chief Chemist for the ANAMAX MINING COMPANY. Dale manages the laboratory work of 15 chemical technicians who are responsible for the analysis of the ore body and quality control of the milling process. He has been a chemist with his company for 26 years, including 10 years with the Anaconda Company, a partner of Anamax. He and his wife, Lois, have 3 daughters, 1 son and 5 grandchildren. Dale is a graduate of the Allan Military Academy in Bryant, Texas, and enjoys hunting, fishing and golf.

# TOPICAL HIGHLIGHTS ABOUT THE ARIZONA COPPER INDUSTRY

## COPPER: A MAJOR CONTRIBUTION TO ARIZONA - $5.6 BILLION *

The economic contribution to Arizona's economy is measured in two ways:

(1) Direct. Actual dollars paid by the industry for services and supplies.

(2) Indirect. Additional dollars are generated as payroll and purchasing dollars recirculate throughout the state's economy buying more goods and services which in turn create more jobs for more Arizonans. These recirculating dollars also create additional tax dollars for the state and its political subdivisions.

The economic benefits to Arizona, both directly and indirectly in 1978 amounted to $5.6 billing in personal, business and government income.

## COPPER DOLLARS STAY IN ARIZONA *

The value of copper output in 1978 was over $1.3 billion. It is estimated that approximately 71¢ from every dollar's worth of copper produced stayed in Arizona. That amount was paid in payrolls, pensions, purchases and local taxes.

Only $383.3 million left the state in the form of federal taxes, out-of-state purchases, debt service and dividends.

* Source: Southwest Economic Information Center

## COPPER: PERSONAL INCOME - ONE OF EVERY ELEVEN DOLLARS FOR ALL ARIZONANS *

In 1978 personal income from copper amounted to $415 million. Although it represented less than three percent of the total personal income of all Arizonans, it amounted to nine percent of the State's basic personal income: (that which comes from tourism, manufacturing, mining, agriculture and federal government). Thus, as basic income dollars recirculate and expand in the economy, the copper industry, directly and indirectly, was responsible for one of every eleven dollars of personal income received in Arizona in 1978. In 1976, this ratio was one dollar out of every eight.

## COPPER: ONE OF EVERY FOUR STATE & LOCAL TAX DOLLARS *

The Arizona copper industry paid almost $103 million to support state, county and municipal governments. The major beneficiaries, however, were the state's school districts which received 46% of the total taxes paid in 1978. The total amount of taxes paid was less than the previous year by approximately $10 million and is a result of adverse impact on the state due to continued curtailments in copper production.

The direct and indirect state and local tax revenues generated by the copper industry totaled more than $439 million. This amount represented approximately one-fourth of all tax revenues received by state and local taxing units.

* Source: Southwest Economic Information Center

## COPPER: INCOME TO OTHER ARIZONA BUSINESSES *

Copper industry purchases in the state in 1978 amounted to almost $412 million. That amount represents 77 percent of the total purchases made for all goods and services necessary for operations, etc.

It is estimated by AMIGOS, the mine suppliers' trade organization, that income to Arizona businesses from copper purchases created approximately 75,000 support jobs for Arizona.

Businesses and individuals receiving these dollars recirculated them through Arizona's economy for goods, services, etc. Copper mines, therefore, became directly and indirectly responsible in 1978 for more than $3.6 billion in income to people working in other industries throughout Arizona. This amount also represents almost three times the value of copper output.

## COPPER: EMPLOYMENT

Arizona's copper industry has always been one of the major sources of employment for Arizonans. This is particularly true with respect to its hiring of members of minority groups. In 1978 the combined wages and benefits paid amounted to over $416,000,000 which breaks down to an average wage of over $20 thousand per employee. An additional $14,000,000 was spent for community hospitals and recreational facilities in mining towns which are available to the general public.

Average Direct Copper Employment in Arizona

| Year | |
|---|---|
| 1975 | 26,200 |
| 1976 | 25,700 |
| 1977 | 22,600 |
| 1978 | 21,100 |
| 6-30-79 | 23,665 |

* Source: Southwest Economic Information Center

## COPPER: PRODUCTION

The United States is the world's leading copper producer and Arizona consistently produces more copper than all the other states combined. Copper, however, is an element that is widely distributed throughout the earth's crust. In 1978, over fifty countries produced in excess of eight and one-half million tons of newly mined copper.

The following charts indicate copper production by region, country and within the United States.

WORLD MINE PRODUCTION OF COPPER
BY REGION - 1978 *

| | Production (Short Tons) | Percent of Total |
|---|---|---|
| North & South America | 3,823,558 | 44.8 |
| Europe | 322,630 | 3.8 |
| Asia | 536,964 | 6.3 |
| Africa | 1,497,917 | 17.6 |
| Australia/New Guinea | 461,169 | 5.4 |
| ** Communist Bloc Nations (including Cuba & China) | 1,872,900 | 21.9 |
| Other | 13,800 | 0.2 |
| TOTAL WORLD PRODUCTION | 8,528,938 | 100.0 |

LEADING COPPER MINE PRODUCING COUNTRIES

1978 *

| | Production (Short Tons) |
|---|---|
| United States | 1,490,235 |
| U.S.S.R. | 1,212,500 |
| Chile | 1,145,100 |
| Canada | 724,793 |
| Zambia | 708,800 |
| Zaire | 463,700 |
| Peru | 371,300 |
| Poland | 319,700 |
| Philippines | 290,372 |
| South Africa | 214,100 |

* Source: American Bureau of Metal Statistics

** Estimate

## COPPER MINE PRODUCTION IN THE UNITED STATES

## BY STATE - 1974-1978 *

| | 1974 | | 1975 | | 1976 | | 1977 | | 1978 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Tonnage | % | Tonnage | % | Tonnage | % | Tonnage | % | Tonnage | % |
| ARIZ. | 858,783 | 53.8 | 813,211 | 57.5 | 1,024,421 | 63.8 | 923,778 | 61.4 | 979,538 | 65.8 |
| UTAH | 230,593 | 14.4 | 177,155 | 12.5 | 185,458 | 11.6 | 194,130 | 12.9 | 204,907 | 13.7 |
| N. MEX. | 196,585 | 12.3 | 146,263 | 10.4 | 172,360 | 10.7 | 164,698 | 11.0 | 141,116 | 9.5 |
| MONT. | 131,131 | 8.2 | 87,959 | 6.2 | 91,111 | 5.7 | 86,203 | 5.7 | 75,106 | 5.0 |
| NEV. | 84,101 | 5.3 | 81,210 | 5.7 | 58,160 | 3.6 | 67,061 | 4.5 | 20,983 | 1.4 |
| MICH. | 67,012 | 4.2 | 73,690 | 5.2 | 43,707 | 2.7 | 42,375 | 2.8 | (Incl. in Other) | |
| OTHER | 28,797 | 1.8 | 33,878 | 2.5 | 30,369 | 1.9 | 25,721 | 1.7 | 68,585 | 4.6 |
| TOTAL | 1,597,002 | 100.0 | 1,413,366 | 100.0 | 1,605,586 | 100.0 | 1,503,966 | 100.0 | 1,490,235 | 100.0 |

The copper mineralization in Arizona contains other metals in varying quantities. If economically and technically feasible, these metals are also extracted and refined for sale in domestic and world markets. Although these metals occur in minute quantities, the vast tonnages processed for copper make the "by-product" production possible.

## ARIZONA BY-PRODUCT PRODUCTION

## 1978 **

| Metal | Production | % of U.S. Production | Rank by State |
|---|---|---|---|
| Molybdenum | 31,753,000 lbs. | 24.1 | 2 |
| Silver | 6,470,836 Tr. Oz. | 16.8 | 2 |
| Gold | 93,021 Tr. Oz. | 9.6 | 4 |

* Source: American Bureau of Metal Statistics

** Source: U.S. Bureau of Mines

## COPPER: CONSUMPTION

Because of its unique and versatile qualities, copper is one of the basic metals necessary for mankind's continued progress. It is also a vital component to the industrial and productive capability of any nation. You will recognize from the following charts that highly industrialized regions and countries are also significant consumers of copper.

You will note that many leading copper producing countries such as Chile, Peru, Philippines, South Africa, Zaire and Zambia do not appear as major consuming countries. Those nations, with Canada, are net copper exporting countries whose production and pricing policies have a direct impact upon Arizona's copper industry. (See "Copper: A Word About The Market" for further clarification of this point.)

WORLD REFINED CONSUMPTION BY REGION

1978 *

| | | Percent of Total |
|---|---|---|
| North & South America | 3,096,200 | 29.6 |
| Europe | 3,109,500 | 29.8 |
| Asia | 1,621,300 | 15.5 |
| Africa | 90,300 | 0.8 |
| Australia/New Guinea | 130,100 | 1.3 |
| Communist Bloc Nations (including Cuba & China) | 2,402,000 | 23.0 |
| TOTAL WORLD REFINED CONSUMPTION | 10,449,400 | 100.0 |

LEADING REFINED COPPER CONSUMERS

1978 *

| | |
|---|---|
| United States | 2,403,000 |
| U.S.S.R. | 1,433,100 |
| Japan | 1,371,700 |
| West Germany | 917,200 |
| United Kingdom | 552,900 |
| Italy | 363,800 |
| France | 341,700 |
| Belgium | 319,700 |
| Canada | 275,700 |
| Brazil | 209,400 |
| Poland | 207,200 |

* Source: American Bureau of Metal Statistics

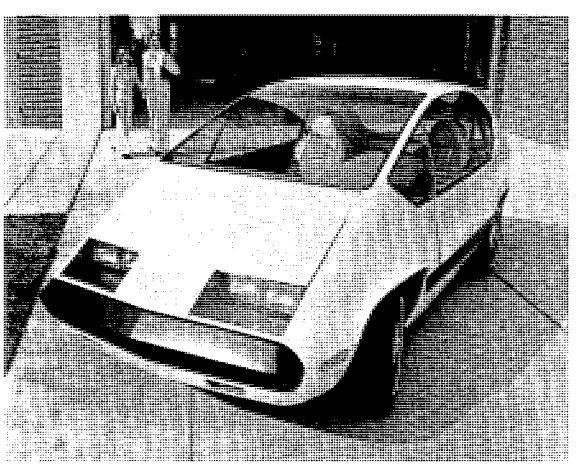
## COPPER: WHO BUYS IT?

Most copper is purchased directly from producers by manufacturers and fabricators for various end uses. The chart below indicates U.S. consumption by broad use categories. Copper, from the producer, may go through many refining, alloying and other alterations before it is ready for its end use.

### General Use Categories *

| Use | % of Total Consumption |
|---|---|
| Building Construction | 30.5 |
| Electrical & Electronic Products | 24.6 |
| Industrial Machinery & Equipment | 15.9 |
| Transportation | 14.5 |
| Consumer & General Products | 14.5 |

## COPPER ELECTRIC AUTOMOBILES - TRANSPORTATION OF THE FUTURE



Automobiles Constructed by the Copper Development Assoc.

* Source: Copper Development Association

## COPPER: A WORD ABOUT THE MARKET

Copper is an internationally traded commodity. However, its price is determined by supply and demand relationships, and by political and governmental policies. Over one-half of the world's supply of copper comes from government controlled economies. The countries of Chile, Peru, Zambia, Zaire, Australia and Papua, New Guinea, have formed the International Council of Copper Exporting Countries (CIPEC) to, among other matters, collectively influence copper market conditions and fix prices. These nations have reported that together they control about 38% of the free world mine capacity and about 72% of the free world export market.

The United States is the world's leading copper producer. Its production costs, though, have grown by over 10¢ per pound by the imposition of governmentally mandated regulations. Foreign produced copper does not all bear a similar burden. U.S. producers must respond to the supply/demand pressure as we operate in a free market economy not subsidized by government. Many competing countries subsidize their production as they depend largely upon their copper exports for foreign exchange with which to buy oil and other strategic consumer goods. There, political and governmental considerations override supply and demand considerations. The result, as we experienced during the recent past, was a sharp increase in lower priced copper imports and a corresponding decrease in U.S. production and jobs.

As reported in last year's issue of "ARIZONA: COPPER CAPITAL, U.S.A.", the impact of imports upon this state's economy was critical. As long as U.S. producers, alone, are subjected to non-productive governmental cost burdens, they will not be able to freely compete in world markets. A return to the ruinous economic situation of the past four years then is certainly a real possibility.

### How Copper is Bought

Most copper used by consumers is high quality copper, refined to 99.9+% purity. On the commodity markets this is listed as "electrolytic grade" and is, ordinarily, in the form of "cathodes" or "wire bars". The price of such copper is quoted on the London Metal Exchange (LME), the New York Commodity Exchange (COMEX) and as U.S. Producer's Price and all these exchanges reflect the available supplies and demand. LME price is, ordinarily, below the Producer's Price in that delivery costs on LME copper must be paid by the consumer. Long term contracts for copper, between consumers and producers, is a negotiated price ordinarily tied in with one of the above exchange prices. Copper scrap, a significant source of copper, is recycled and sold on the same markets.

## Inflationary Impact Upon Copper Prices

Inflation hurts everyone! Its toll upon incomes and the costs of running our homes dramatically reveals itself everyday. Economists generally agree that the size and cost of government adds significantly to inflationary pressures. The growth of the role of government in our lives and the economy is indicated by the fact that in 1940, government spending equalled 18% of the nation's Gross National Product. By 1979, government spending amounted to about one-third of the GNP.

Shown below is a comparison of the declining value of the dollar and its impact upon the annual average price of copper. The reader may wish to use this chart to evaluate the "inflationary" impact upon their personal income and cost of living.

| Year | CPI * | Decline of Dollar as a % of 1967 | Annual ** Aver. Price of Cu per Pound | Adjusted Price of Cu to 1967 Dollars |
|---|---|---|---|---|
| 1967 | 100 | ---- | 38.226¢ | 38.226¢ |
| 1968 | 104.2 | 96.0 | 41.847¢ | 40.160¢ |
| 1969 | 109.8 | 91.1 | 47.534¢ | 43.291¢ |
| 1970 | 116.3 | 86.0 | 57.700¢ | 49.613¢ |
| 1971 | 121.3 | 82.4 | 51.433¢ | 42.401¢ |
| 1972 | 125.3 | 80.0 | 50.617¢ | 40.396¢ |
| 1973 | 133.1 | 75.1 | 58.865¢ | 44.226¢ |
| 1974 | 147.7 | 67.7 | 76.649¢ | 51.895¢ |
| 1975 | 161.2 | 62.0 | 63.535¢ | 39.413¢ |
| 1976 | 170.5 | 58.6 | 68.824¢ | 40.365¢ |
| 1977 | 181.5 | 55.1 | 65.804¢ | 36.255¢ |
| 1978 | 195.4 | 51.2 | 66.510¢ | 34.037¢ |
| 1979(Jul) | 218.9 | 45.7 | 90.131¢ | 41.174¢ |

* Consumer Price Index as published by the Bureau of Labor Statistics, U.S. Department of Labor

** Source: Metals Week

## Property Tax

Arizona uses a property classification system which results in imposing a greater tax burden on some taxpayers that it does on others. The system currently utilizes seven classes of property with a different assessment ratio for each class. For example: mining property in Class I is assessed at 60% of its "full cash value"; utility property in Class II is assessed at 50%; manufacturing and other commercial property in Class III are assessed at 27%, while agricultural property and owner occupied homes in Classes IV and V are assessed at 18% and 15% respectively.

The result of the system is to require a Class I taxpayer to pay more than double the amount of taxes paid by a Class III taxpayer and a class III taxpayer to pay almost double the amount paid by a Class V taxpayer on property having the same dollar values.

Whenever tax programs are discussed, two concepts emerge as fundamental to the design of a good system. These are: (1) the "ability to pay" principle, and (2) the "benefits received" principle. Following close behind are the tenets that the tax should be "equitable" and "visible" -- that is to say, people should know "who" is really paying the tax. Arizona's property classification system violates all of these principles.

The Arizona Academy's 1979 Town Hall Report states that the current system cannot be defended on the basis of logic or fairness and calls for its eventual elimination. The Governor's Commission on Tax Reform has recommended that the present system be cut from 7 classes to 3, and that mines, rails, utilities, manufacturing and other commercial property be placed in the same class with the same assessment ratio. The 1979 Arizona Tax Conference has made a similar recommendation. With respect to Arizona's copper industry, the present classification system is not only discriminatory, it is destructive of vital natural resources.

## Severance and Value Added Tax

Arizona also has a combination severance and a value added tax, even though it is called by another name. The tax is comprised of a (1) Privilege Sales Tax; (2) Education Excise Tax; and (3) Special Education Excise Tax. As applied, it is a tax upon the gross value of mineral and forest products shipped out of the state for subsequent sale. In the case of the copper industry, it amounts to 2.5% of that value, regardless of the profitability of the operation. (In 1978, the Arizona Legislature reduced the tax to 2% for a two-year period.)

To the extent the tax is applied to the value of unprocessed ore, it is a "severance" tax. Copper ore, of course, increases in value because of the operator's productive activities in milling and smelting the raw material. Since the tax is applied to the increased value of the mineral product resulting from these activities, it is also a "value added" tax.

This combination "severance and value added tax is another means the State uses to impose a greater tax burden on some taxpayers than it does on others. For example, there is no similar tax applied to agricultural, manufactured or other processed commodities shipped for sale outside the state.

Since copper is a world commodity subject to trading on market exchanges, this tax cannot be effectively "passed on" to a purchaser. It becomes an additional "cost" of production that adversely affects the ability of Arizona producers to compete against foreign produced copper.

This combination tax, taken together with the property tax, results in a greater tax burden on "mining" in Arizona than in any of the eight western states, according to a study by Dr. Donald W. Gentry of the University of Arizona.

Citing the danger of increased dependence on "mineral imports" and lost "employment opportunities", Dr. Gentry observed, "If state legislators choose to be shortsighted and impose tax policies which discourage development and investments in the mining industry, the consequences could be disastrous."

## COPPER: WATER USE

Water is a vital commodity to everyone in Arizona as the southwestern climate has a limited available supply. Surface and groundwaters are not adequate to meet present and future demands by agricultural, industrial and municipal users. In response to a recent State Supreme Court ruling that jeopardized the water supplies of the state's major metropolitan areas and those of several copper mines, the Legislature, in 1977, established a Groundwater Management Study Commission. Its purpose was to develop a comprehensive groundwater management code and submit its recommendations to the Governor and the Legislature. The work of this Commission is presently under way and when completed will have a significant impact upon Arizona's future.

The charts and graphs below depict water sources and uses in Arizona. You will note that mining uses about 2.7% of all water consumed in the state. Unfortunately, ore bodies were not placed near adequate supplies of water. As a necessary consequence, water must then be transported from its source to the operating site where it is critical in the milling process of separating the copper from the waste material. Without a necessary supply of water, mining activity would cease. Mining processes recycle and reuse the available water many times. Conservation practices of this nature must be practiced wherever possible to reduce unnecessary demands on available water.

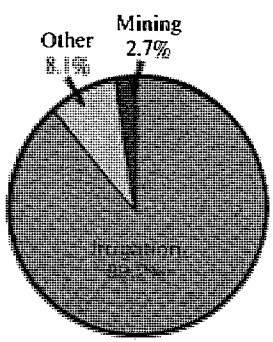
### Water Uses (A)

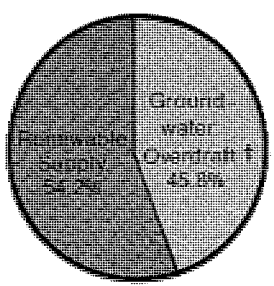
| | |
|---|---|
| Irrigation | 4,294,000 Acre Feet* |
| Other | 389,000 |
| Mining | 131,000 |
| Total | 4,814,000 Acre Feet |

**An acre foot (AF) is 325,850 gallons, enough water to cover one acre of land to a depth of one foot.*

### Water Sources (A)

| | |
|---|---|
| Renewable Supply Surface Water, Ground-Water Recharge | 2,600,000 Acre Feet |
| Overdraft (Groundwater) | 2,200,000 |
| Total | 4,800,000 Acre Feet |




*† Groundwater used but not replaced resulting in a declining water table.*

(A) Source: Arizona Water Commission

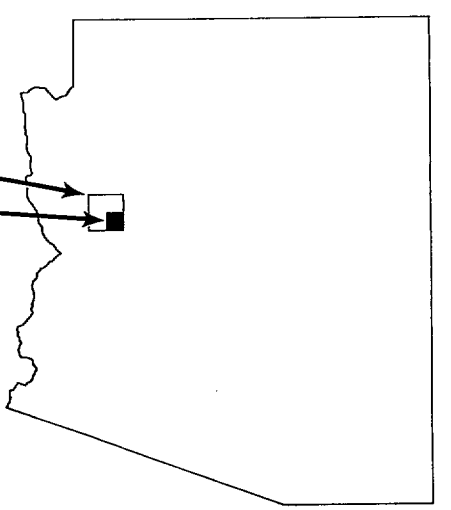
## COPPER: LAND USE AND THE ENVIRONMENT

This nation's economy and security requires vast amounts of mineral products. If minerals can be mined within this country, our well-being is immeasurably strengthened. If they are imported, we are dependent upon uncertain supplies, and jobs, prices and our economy suffers. National well-being dictates that we should, whenever possible, rely upon and develop our own natural resources. Our dependence upon high priced foreign oil and its negative impact upon our total economy is an example of problems with exporting countries.

The greatest potential for mineral development in this nation lies in the west and Alaska. However, much of this area has been withdrawn for exploration and mineral development by Federal land policies and regulations. It has been estimated that approximately 63% of all of the land in the 12 western states is controlled by the Federal Government. Of Arizona's 72.6 million acres, about 70% are public lands and Indian reservations, 12% are state lands and 18% is privately owned. Thus, Federal policies and regulations exert far greater influence over this state's natural resources than do Arizonans.

Two Federal programs, the Roadless Area Review and Evaluation (RARE II) and the BLM Wilderness Review, have been instituted to identify millions of additional acres for "Wilderness" designation. Wilderness means that resource development and the multiple use concept, which includes most recreational pursuits, will be essentially eliminated. The mining industry strongly supports the multiple use concept on all public lands. However, when millions of acres are "locked up" without knowledge of their subsurface values, our present and future economy will greatly suffer. It is essential that we strike a balance of good stewardship between our environment and our economy.

The diagram below shows the relatively small amount of land required in Arizona to produce approximately two-thirds of this nation's newly mined copper which contributes $5.6 billion to Arizona's economy. Wouldn't you say that is putting this land to pretty good use?




**Acres**
Arizona total land area .....72,688,000
Total devoted to mining (1978) ..... 193,346

INCOME TO OTHER ARIZONA BUSINESSES
PROVIDED BY THE ARIZONA COPPER INDUSTRY
1978 *

| Economic Sector | Goods and Services Purchased -- (In Thousands of Dollars) | |
|---|---|---|
| Agriculture | | $ 193.0 |
| Other Mineral Industries | | 436.0 |
| Contract Construction | | 26,910.0 |
| Manufacturing | | 55,158.0 |
| Lumber and Wood Products | $ 1,100.6 | |
| Paper and Paper Products | 189.3 | |
| Printing and Publishing | 295.6 | |
| Chemicals | 17,437.3 | |
| Rubber and Plastics | 1,622.1 | |
| Stone, Clay and Glass Products | 1,147.1 | |
| Primary Metals (except copper) | 19,826.2 | |
| Fabricated Metal Products | 1,756.5 | |
| Non-Electrical Machinery | 6,045.3 | |
| Electrical Machinery and Equipment | 5,478.8 | |
| All Other Manufacturing | 259.2 | |
| Transportation | | 29,256.4 |
| Communications | | 1,802.4 |
| Public Utilities | | 133,663.5 |
| Wholesale Trade | | 150,197.1 |
| Automotive Equipment | 19,937.1 | |
| Drugs and Chemicals | 1,149.4 | |
| Apparel | 1,544.6 | |
| Electrical Goods | 9,955.1 | |
| Hardware, Plumbing and Heating Supplies | 25,201.2 | |
| Machinery and Equipment | 52,992.8 | |
| Petroleum Products | 29,043.1 | |
| All Other Wholesalers | 10,373.8 | |
| Retail Trade | | 7,339.8 |
| Building Materials and Supplies | 1,347.1 | |
| General Merchandise | 252.5 | |
| Automobile Dealers and Service Stations | 5,053.1 | |
| All Other Retailers | 587.1 | |

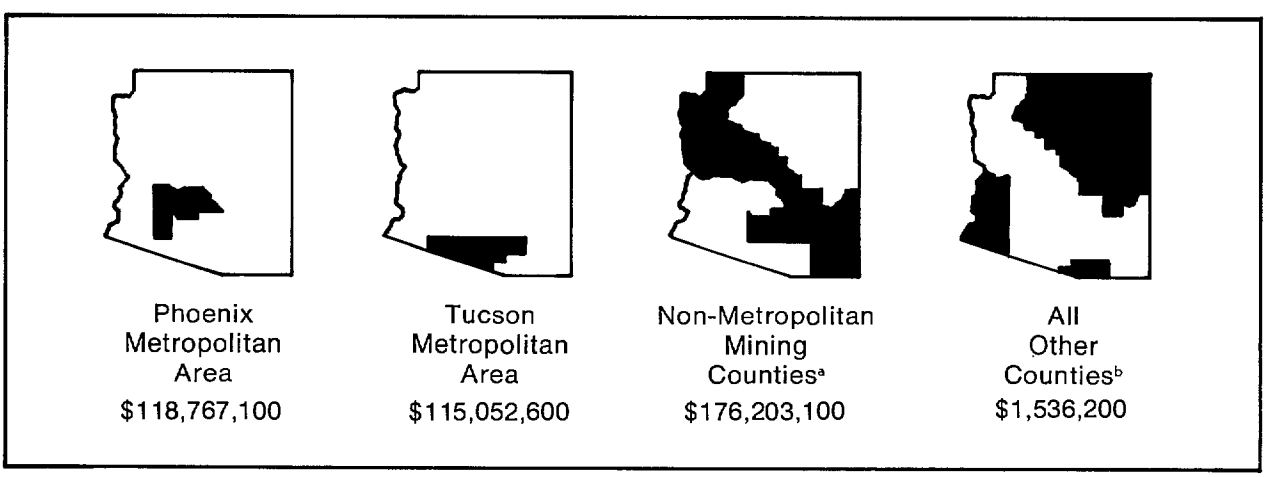
Income to Other Arizona Businesses (Continued)

| Economic Sector | | Goods and Services Purchased -- (In Thousands of Dollars) |
|---|---|---|
| Finance, Insurance and Real Estate | | $ 2,765.0 |
| Services | | 3,837.8 |
| Personal Services | $ 61.8 | |
| Business Services | 2,022.6 | |
| Automotive Repair Services | 399.3 | |
| Other Repair Services | 315.8 | |
| Miscellaneous Professional Services | 666.1 | |
| All Other Services | 372.2 | |
| TOTAL ARIZONA PURCHASES | | $411,559.0 |

* Source: Southwest Economic Information Center, based on data from the Arizona Department of Mineral Resources, the Arizona Mining Association, and individual copper producing firms.

**GEOGRAPHICAL DISTRIBUTION — 1978**

All sectors of the State benefit from copper industry purchases.




a) Cochise, Gila, Graham, Greenlee, Mohave, Pinal, Yavapai Counties.

b) Apache, Coconino, Navajo, Santa Cruz, and Yuma Counties.

TOTAL STATE & LOCAL GOVERNMENT REVENUES
PROVIDED BY THE ARIZONA COPPER INDUSTRY
1976 - 1978 *

| Type of Revenue | Amount Paid -- (In Thousands of Dollars) | | |
|---|---|---|---|
| | 1976 | 1977 | 1978 |
| Property Taxes | $55,801 | $54,927 | $49,727 |
| Severance Taxes[a] | | | |
| Privilege Sales Tax | 12,050 | 12,243 | 13,944 |
| Education Excise Tax | 6,025 | 6,122 | 6,972 |
| Special Excise Tax for Education | 12,050 | 12,243 | 9,508 |
| Corporate Income Tax | 5,300 | 1,035 | 1,317 |
| Payroll Taxes | | | |
| Unemployment Compensation | 2,047 | 3,819 | 4,288 |
| Workmen's Compensation | 6,871 | 6,409 | 4,378 |
| Miscellaneous Taxes[b] | 11,636 | 13,747 | 11,251 |
| Land Rentals and Royalties | 2,227 | 2,263 | 1,473 |
| TOTAL | $114,007 | $112,808 | $102,858 |

[a] Defined in Arizona as taxes paid on the value of mineral products sold or exported from the state.

[b] Includes sales taxes paid on Arizona purchases as well as motor vehicle licenses and fees.

* Source: Southwest Economic Information Center

ARIZONA STATE GOVERNMENT REVENUES
PROVIDED BY THE ARIZONA COPPER INDUSTRY
1976 - 1978 *

| Source of Revenue | Amount of Revenue -- (Thousands of Dollars) | | |
|---|---|---|---|
| | 1976 | 1977 | 1978 |
| State Property Tax | $11,168 | $10,911 | $ 6,173 |
| Severance Taxes[a] | | | |
| Privilege Sales Tax | 4,989[b] | 5,069[b] | 5,773[b] |
| Education Excise Tax | c | c | c |
| Special Excise Tax for Education | c | c | c |
| Corporate Income Tax | 3,486[b] | 601[b] | 1,034[b] |
| Payroll Taxes | | | |
| Unemployment Compensation | 2,047 | 3,819 | 4,288 |
| Workmen's Compensation | 6,871 | 6,409 | 4,378 |
| Sales Taxes on Purchases | | | |
| Privilege Sales Tax | 1,186[b] | 2,243[b] | 1,145[b] |
| Education Excise Tax | c | c | c |
| Special Excise Tax for Education | c | c | c |
| Motor Vehicle Taxes and Fees | 180 | 202 | 186 |
| Land Rentals and Royalties | 2,227 | 2,263 | 1,473 |
| TOTAL | $32,154 | $31,517 | $24,450 |

[a] Defined in Arizona as taxes paid on the value of mineral products sold or exported from the state.

[b] Excludes amounts shared with county and municipal governments.

[c] Although paid directly to the State General Fund, all educational excise taxes are in fact distributed to the school districts.

* Source: Southwest Economic Information Center

COUNTY GOVERNMENT REVENUES
PROVIDED BY THE ARIZONA COPPER INDUSTRY
1976 - 1978 *

| County | Amount of Revenue[a] -- (Thousands of Dollars) | | |
|---|---|---|---|
| | 1976 | 1977 | 1978 |
| Pima | $ 9,362 | $ 8,873 | $ 7,723 |
| Pinal | 4,541 | 4,887 | 4,323 |
| Gila | 3,846 | 3,551 | 2,752 |
| Maricopa | 2,576 | 3,493 | 2,693 |
| Cochise | 736 | 687 | 1,092 |
| Yavapai | 770 | 853 | 831 |
| Mohave | 350 | 292 | 266 |
| Coconino | 209 | 160 | 198 |
| Yuma | 152 | 181 | 152 |
| Navajo | 116 | 112 | 143 |
| Greenlee | 616 | 364 | 93 |
| Apache | 32 | 25 | 38 |
| Graham | 40 | 44 | 37 |
| Santa Cruz | 40 | 42 | 34 |
| TOTAL | $23,386 | $23,564 | $20,375 |

[a] Contributed directly through the property tax and the automatic apportionment of privilege sales taxes collected by the State.

* Source: Southwest Economic Information Center

MUNICIPAL GOVERNMENT REVENUES
PROVIDED BY THE ARIZONA COPPER INDUSTRY
1978 *

| Municipality | Amount of Revenue (a) | Municipality | Amount of Revenue (a) |
|---|---|---|---|
| Phoenix | $1,793,609 | Benson | $ 9,152 |
| Tucson | 843,957 | Show Low | 9,054 |
| | | Surprise | 8,907 |
| Mesa | 270,149 | Somerton | 8,300 |
| Hayden | 269,066 | | |
| Tempe | 251,702 | Florence | 7,841 |
| Scottsdale | 209,295 | Wickenburg | 7,796 |
| Glendale | 180,429 | Payson | 7,752 |
| | | Thatcher | 7,680 |
| Flagstaff | 84,104 | Willcox | 7,252 |
| Yuma | 80,648 | Buckeye | 6,967 |
| | | Snowflake | 6,895 |
| Sierra Vista | 53,945 | Williams | 6,396 |
| Chandler | 53,709 | Goodyear | 6,280 |
| Prescott | 45,279 | | |
| Casa Grande | 36,610 | Mammoth | 5,477 |
| Douglas | 33,411 | Chino Valley | 5,415 |
| Bisbee | 26,253 | Eagar | 5,263 |
| Nogales | 25,677 | Parker | 5,223 |
| Paradise Valley | 24,450 | Youngtown | 5,058 |
| Winslow | 21,623 | Saint Johns | 4,928 |
| Kingman | 21,531 | Gila Bend | 4,812 |
| Peoria | 20,802 | Huachuca City | 4,531 |
| | | Taylor | 4,023 |
| Globe | 19,675 | | |
| Coolidge | 17,992 | Marana | 3,943 |
| Avondale | 17,765 | Pima | 3,867 |
| Eloy | 17,403 | Tombstone | 3,367 |
| South Tucson | 16,659 | Oro Valley | 3,158 |
| Miami | 16,028 | Springerville | 3,086 |
| Safford | 15,945 | Clarkdale | 2,863 |
| Page | 15,798 | Winkelman | 2,614 |
| Holbrook | 13,652 | Wellton | 2,591 |
| Clifton | 13,639 | Fredonia | 2,141 |
| Superior | 13,483 | Duncan | 2,074 |
| Guadalupe | 11,489 | | |
| El Mirage | 10,481 | Patagonia | 1,691 |
| Tolleson | 10,405 | Jerome | 776 |
| Kearny | 9,542 | | |
| Gilbert | 9,661 | | |
| Cottonwood | 9,625 | TOTAL | $4,762,663 |

(a) Contributed directly through the property tax and the automatic apportionment of privilege sales taxes and corporate income taxes collected by the State of Arizona.

* Source: Southwest Economic Information Center

SCHOOL DISTRICT REVENUES
PROVIDED BY THE ARIZONA COPPER INDUSTRY
1978 *

| School District | Amount of Revenue (a) |
|---|---|
| Mammoth-San Manuel Unified | $3,613,276 |
| Sahuarita Unified | 3,299,067 |
| Tucson Unified | 2,943,663 |
| Miami Unified | 2,689,675 |
| Hayden-Winkelman Unified | 2,354,342 |
| Morenci Unified | 2,343,634 |
| Douglas Unified | 1,853,876 |
| Mesa Unified | 1,492,056 |
| Ajo Unified | 1,428,023 |
| Bagdad Unified | 1,378,578 |
| Phoenix Union High School | 1,312,112 |
| Casa Grande Combined (b) | 1,310,827 |
| Scottsdale Unified | 1,239,237 |
| Superior Combined (b) | 1,270,251 |
| Washington Elementary | 1,200,703 |
| Tempe Combined (b) | 962,808 |
| Ray Unified | 953,864 |
| Glendale Union High School | 862,130 |
| Marana Combined (b) | 770,942 |
| Paradise Valley Unified | 749,023 |
| Cartwright Elementary | 607,414 |
| Yuma Combined (b) | 496,204 |
| Sunnyside Unified | 491,462 |
| Roosevelt Elementary | 453,377 |
| Amphitheater Combined (b) | 453,327 |
| Flagstaff Unified | 411,648 |
| Alhambra Elementary | 372,803 |
| Glendale Elementary | 354,246 |
| Chandler Unified | 330,037 |
| Phoenix Elementary | 327,042 |
| Peoria Unified | 319,206 |
| Mohave Union High School | 299,919 |
| Deer Valley Elementary | 292,651 |
| Sierra Vista Combined (b) | 264,599 |
| Madison Elementary | 239,841 |
| Isaac Elementary | 236,397 |
| Prescott Unified | 229,908 |
| Bisbee Unified | 226,186 |
| Nogales Unified | 222,620 |
| Creighton Elementary | 221,222 |
| Clifton Unified | 216,480 |
| Chinle Combined (b) | 202,654 |

| School District | Amount of Revenue (a) |
|---|---|
| Dysart Unified | $ 180,193 |
| Flowing Wells Unified | 171,008 |
| Benson Combined (b) | 161,164 |
| Chloride Elementary | 152,786 |
| Globe Unified | 144,709 |
| Tuba City Unified | 140,610 |
| Window Rock Combined (b) | 140,510 |
| Gilbert Unified | 139,562 |
| Osborn Elementary | 132,924 |
| Winslow Unified | 131,526 |
| Coolidge Unified | 130,977 |
| Crane Elementary | 127,482 |
| Safford Combined (b) | 122,242 |
| Holbrook Unified | 120,695 |
| Kingman Elementary | 118,610 |
| Tolleson Combined (b) | 116,550 |
| Snowflake Unified | 112,208 |
| Murphy Elementary | 100,728 |
| Eloy Combined (b) | 97,384 |
| Apache Junction Combined (b) | 91,394 |
| Page Unified | 89,847 |
| Balsz Elementary | 89,048 |
| Avondale Elementary | 88,649 |
| Kayenta-Monument Valley Uni. | 88,300 |
| Laveen Elementary | 87,451 |
| Ganado Combined (b) | 86,003 |
| Pendergast Elementary | 85,055 |
| Lake Havasu Elementary | 83,857 |
| Buckeye Combined (b) | 77,518 |
| Fort Huachuca Elementary | 76,519 |
| Kyrene Elementary | 76,270 |
| Willcox Unified | 74,773 |
| Wilson Elementary | 72,427 |
| Littleton Elementary | 72,177 |
| Agua Fria Union High School | 70,180 |
| Catalina Foothills Comb. (b) | 70,081 |
| Show Low Unified | 69,930 |
| Cottonwood-Oak Creek Elem. | 66,985 |
| Parker Elementary | 66,037 |
| Whiteriver Elementary | 64,091 |
| Pinetop-Lakeside Unified | 62,444 |
| Tanque Verde Combined (b) | 61,345 |

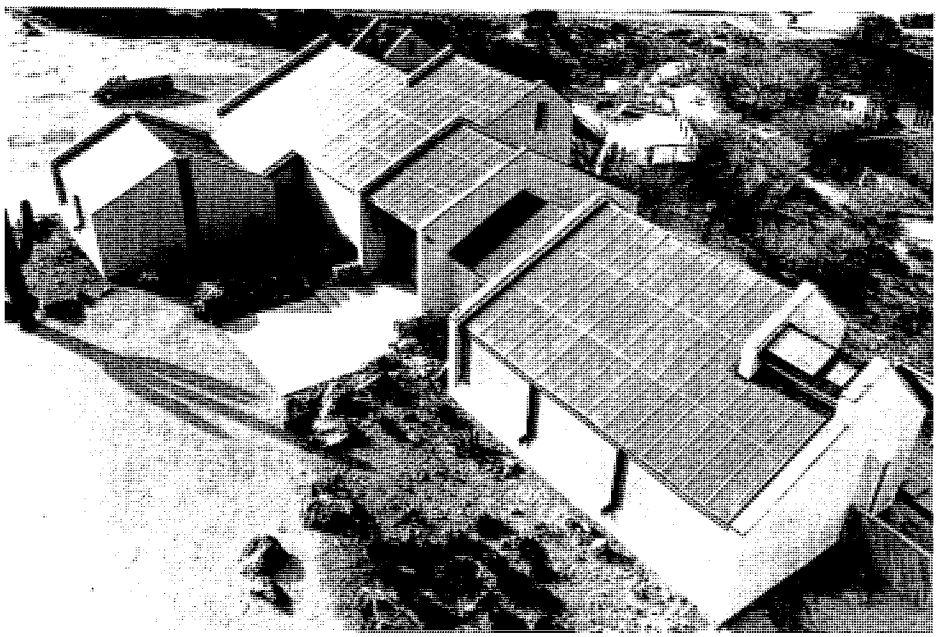
School District Revenues (Continued)

| School District | Amount of Revenue (a) |
|---|---|
| Litchfield Park Elementary | $ 60,297 |
| Somerton Elementary | 60,297 |
| Rice Elementary | 55,106 |
| Apache County High School | 54,258 |
| Payson Unified | 52,310 |
| Continental Elementary | 51,399 |
| Thatcher Unified | 50,963 |
| Tombstone Unified | 50,663 |
| Florence Unified | 50,564 |
| Indian Oasis Combined (b) | 50,464 |
| Wickenburg Unified | 47,569 |
| Bullhead City Elementary | 45,023 |
| Mingus Union High School | 44,574 |
| Round Valley Elementary | $ 41,829 |
| Oracle Elementary | 39,453 |
| Camp Verde Unified | 38,434 |
| Williams Unified | 38,185 |
| Gila Bend Unified | 36,538 |
| Hopi Combined (b) | 36,288 |
| Saint Johns Elementary | 36,288 |
| Humboldt Unified | 34,940 |
| Duncan Unified | 34,690 |
| Sacaton Elementary | 34,690 |
| Maricopa Unified | 34,092 |
| All Other School Districts | 1,073,990 |
| TOTAL | $47,762,483 |

(a) Provided directly through the property tax and the apportionment of educational excise taxes collected by the State of Arizona.

(b) Combined elementary and high school districts.

* Source: Southwest Economic Information Center

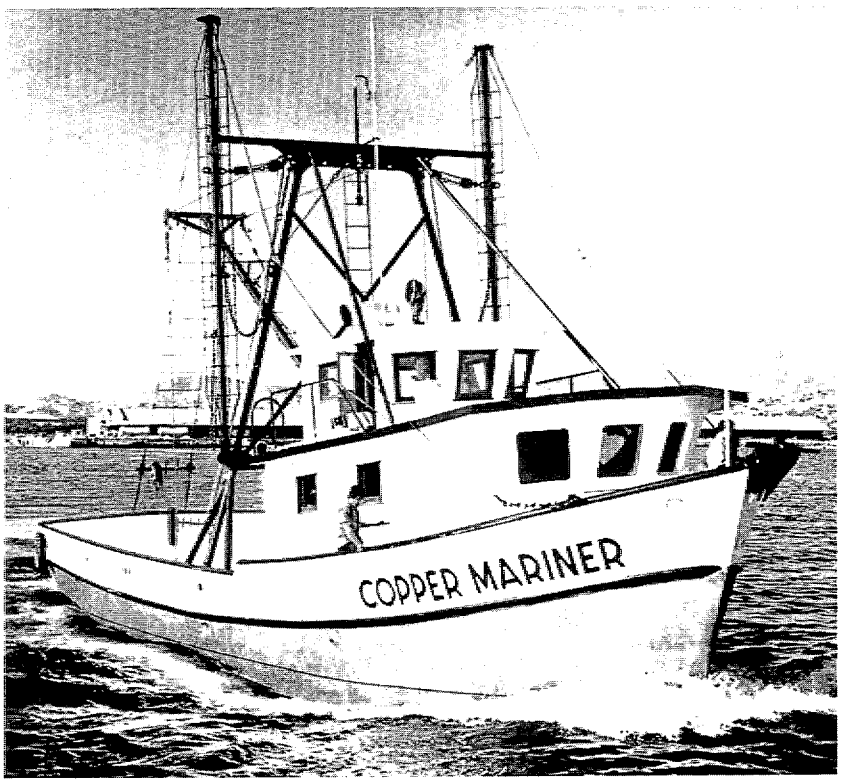


COPPER SOLAR PANELS AND
TUCSON'S "DECADE 80 SOLAR HOUSE"
Constructed by the Copper Development Association

COMMUNITY COLLEGE REVENUES
PROVIDED BY THE ARIZONA COPPER INDUSTRY
1978 *

| Community College District | Amount of Revenue[a] |
|---|---|
| Central Arizona | $1,446,057 |
| Pima | 1,299,229 |
| Yavapai | 529,870 |
| Cochise | 386,363 |
| Mohave | 54,136 |
| Eastern Arizona | 2,104 |
| TOTAL | $3,717,759 |

[a] Contributed directly through the property tax.
* Source: Southwest Economic Information Center




COPPER-NICKEL HULLS INCREASE
USE AND DECREASE COSTS
The Copper Mariner is a prototype of the Copper Development Association

The Arizona Mining Association is a Business League of copper producers. Its purpose is to accumulate and make available, to Arizonans and the country at large, information about the copper industry and of its importance to our lives and to our economy. For further information, please feel free to contact us.

ARIZONA MINING ASSOCIATION
100 West Clarendon, Suite 1720
Phoenix, Arizona 85013
Telephone: (602) 266-4416

MEMBER COMPANIES

AMAX ARIZONA, INC.

THE ANACONDA COMPANY

ANAMAX MINING COMPANY

ASARCO, INCORPORATED

* CASA GRANDE COPPER COMPANY

CITIES SERVICE COMPANY

CYPRUS MINES CORPORATION

CYPRUS PIMA MINING COMPANY

DUVAL CORPORATION

INSPIRATION CONSOLIDATED COPPER COMPANY

KENNECOTT MINERALS COMPANY

McALESTER FUEL COMPANY

MAGMA COPPER COMPANY

* NORANDA LAKESHORE MINES INC.

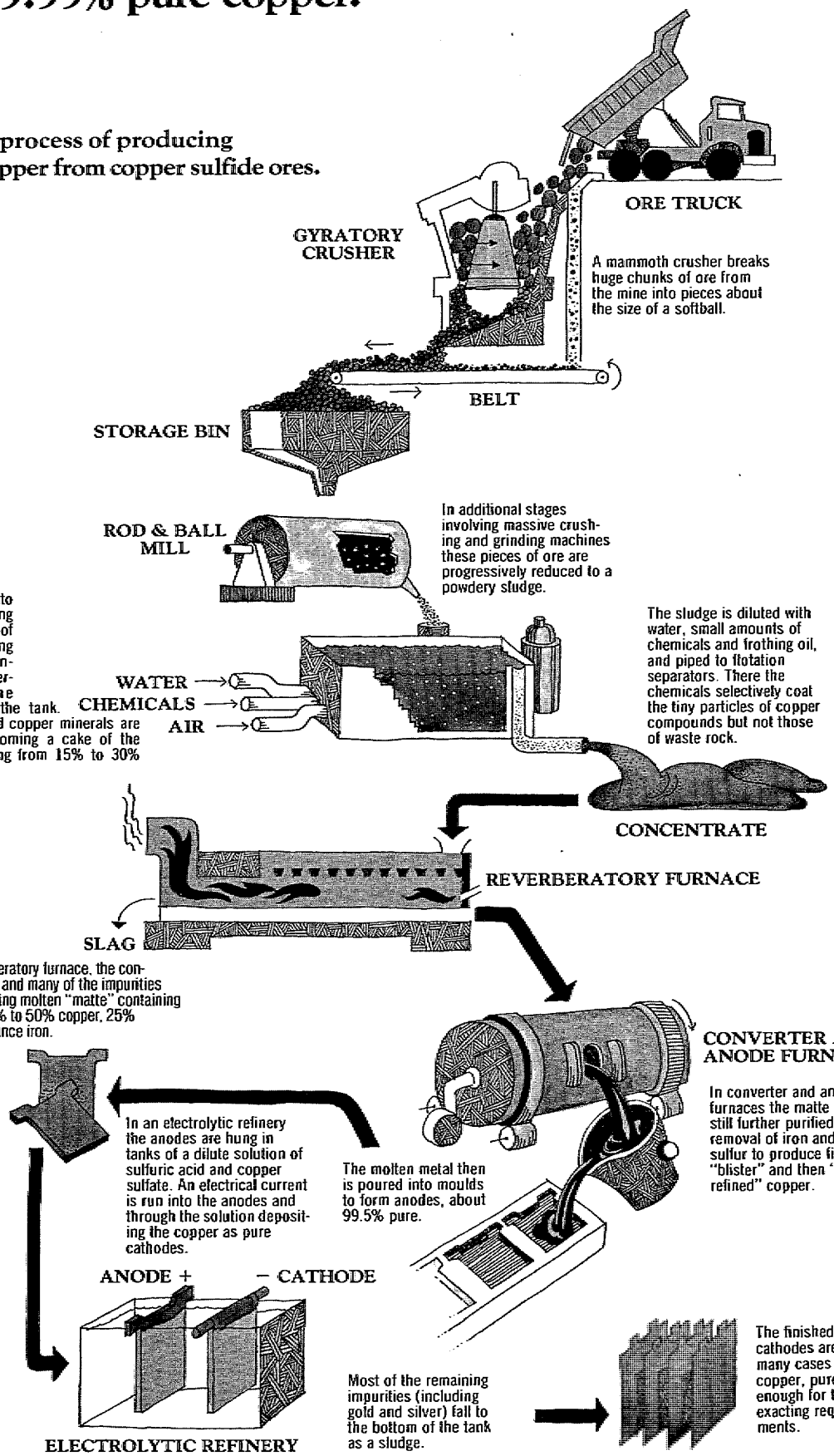
PHELPS DODGE CORPORATION

RANCHERS EXPLORATION & DEVELOPMENT CORPORATION

*Became a Member during 1979.

# Processing 0.6% low grade ore into 99.99% pure copper.

A process of producing copper from copper sulfide ores.




. . . Two tons of waste rock must be discarded to obtain one ton of ore at the crusher.

. . . Flotation removes approximately 45 pounds of copper concentrate, and discards about 1,955 pounds of waste in the form of tailings.

Sulfur dioxide and other impurities are vented to an acid plant, where the gas is scrubbed dryed, cooled and converted to sulfuric acid.

. . . In the smelter the 45 pounds of copper concentrate are reduced to approximately 10 pounds of copper. The rest is discarded in the form of slag.

Note: Figures used are statewide industry averages and will vary at each operation.

**A process of producing copper from copper oxide ores.**

Copper is removed from oxide ore by leaching – using sulfuric acid solution to dissolve the copper from the ore – in place, in heaps or in large vats.

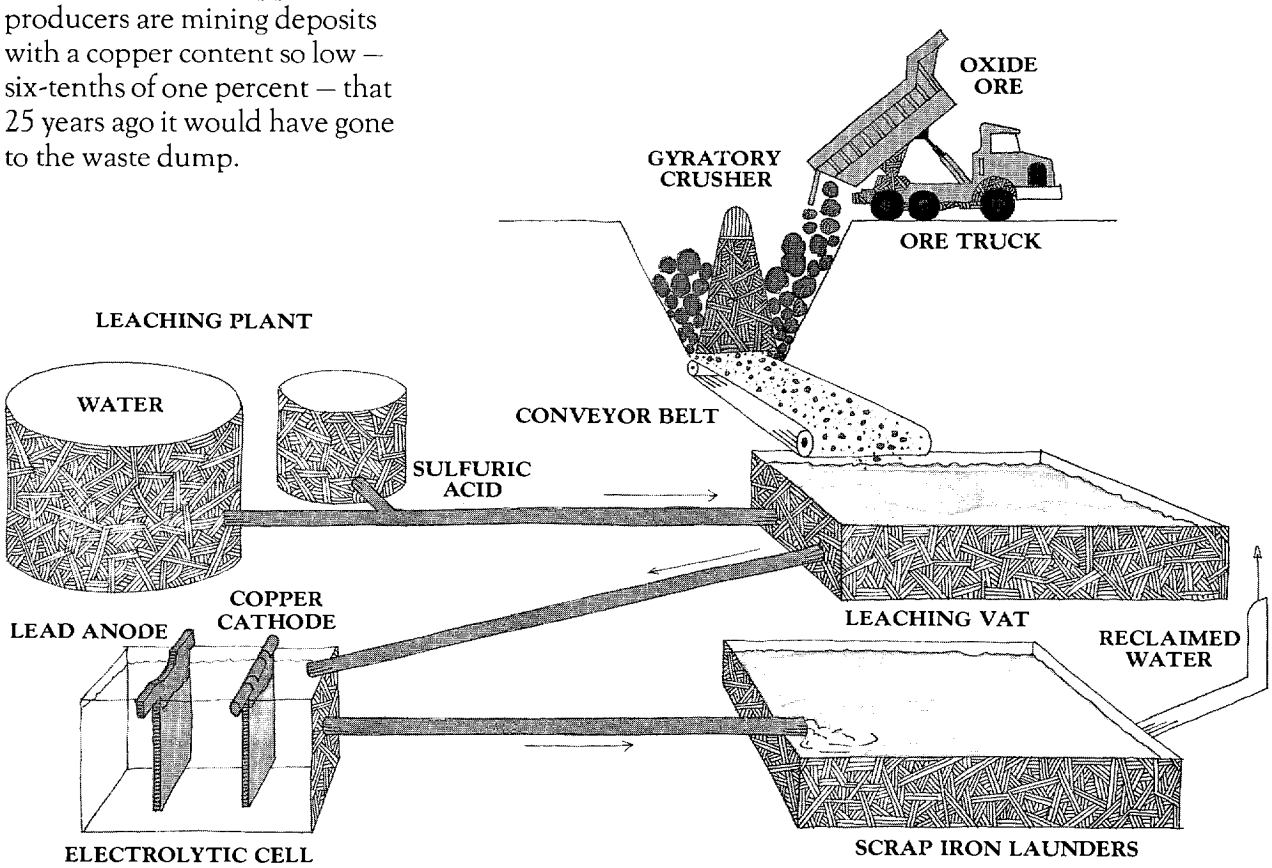
**Working low grade ores once considered waste.**

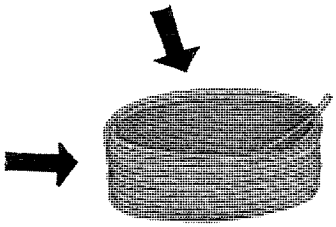
The "high grade" 5-10 percent copper ores of the early 1900s are nearly gone.

Today, Arizona copper producers are mining deposits with a copper content so low – six-tenths of one percent – that 25 years ago it would have gone to the waste dump.

The leaching process is being used at almost all Arizona copper mines to recover copper from low grade material, once considered too marginal to work. This is another conservation effort by the copper industry.

Year after year, Arizona's copper industry continues to produce over half the nation's new copper from low grade ores.



COILED 5/16" CONTINUOUS CAST ROD

In the electrolytic winning plant, the copper from the copper sulfate (leach) solution is electroplated onto a cathode and is ready for market. The remaining, weak copper-bearing solution is washed over scrap iron which removes the last bit of copper. The resulting red-brown "cement" copper (85% copper) is usually sent to a smelter.

ARIZONA MINING ASSOCIATION