35TH ANNUAL REPORT

ARIZONA DEPARTMENT OF MINERAL RESOURCES

and

ARIZONA MINERAL MUSEUM

Fiscal Year 1973 - 1974

Mineral Building
Fairgrounds

JOHN H. JETT - DIRECTOR

Phoenix, Arizona
85007

Honorable Jack Williams
Governor of Arizona
Capitol Building
Phoenix, Arizona 85007

Dear Governor Williams:

In accordance with ARS 27-106 we are pleased to submit the annual report of the Department of Mineral Resources and the Arizona Mineral Museum. The report covers the Department's and the Museum's activities for fiscal 1973-1974, the quarterly reports of the director and a complete financial statement, all as required by ARS 27-106.

BOARD OF GOVERNORS,
ARIZONA DEPARTMENT OF MINERAL RESOURCES
ARIZONA MINERAL MUSEUM

William T. Elsing, Chairman
Robert C. Bogart
Robert E. Heineman
Walter E. Heinrichs, Jr.
Ronald F. Teissere

BOARD OF GOVERNORS

William T. Elsing - Chairman - Phoenix
(Term expires January 31, 1976)

Robert C. Bogart - Bagdad
(term expires Jan. 31, 1974)

Robert E. Heineman - Tucson
(term expires Jan. 31, 1975)

Walter E. Heinrichs, Jr. Tucson
(term expires Jan. 31, 1977)

Ronald F. Teissere - Kingman
(term expires Jan. 31, 1978)

PERSONNEL

Phoenix Office - Mineral Building, Fairgrounds - 258-6681

John H. Jett	Director
Mrs. Glenn W. Pare	Adm. Assistant
Fremont T. Johnson	Field Engineer
Glen Walker	Field Engineer
Ken A. Phillips	Director, Statistics & Eduction
Mrs. Pauline Halloren	Secretary
Mrs. Gina Schillereff	Secretary
Mrs. Judy McClish	Secretary

Tucson Office - Room 208, State Office Building - 882-5399

Gerald W. Irvin	Field Engineer
R. E. Lehner	Field Engineer

Mineral Museum - Mineral Building, Fairgrounds - 257-0821

Lee Hammons	Curator
Mrs. Elizabeth Smith	Secretary

STATUTORY POWERS AND DUTIES

Aid in the promotion and development of the mineral resources of the State.

Conduct studies of the economic problems of prospectors and operators of small mines for the purpose of assisting in their solution.

Assist in discovering sources of supply for persons desiring to buy minerals.

List and describe available mining properties.

Make mineral resource surveys and conduct other investigations which may interest capital in the development of the state's mineral resources.

Serve as a bureau of mining information in conjunction with Arizona Bureau of Mines.

Publish and disseminate information and data necessary or advisable to attain its objectives.

Cooperate with the State Land Department to encourage mining activity on state lands.

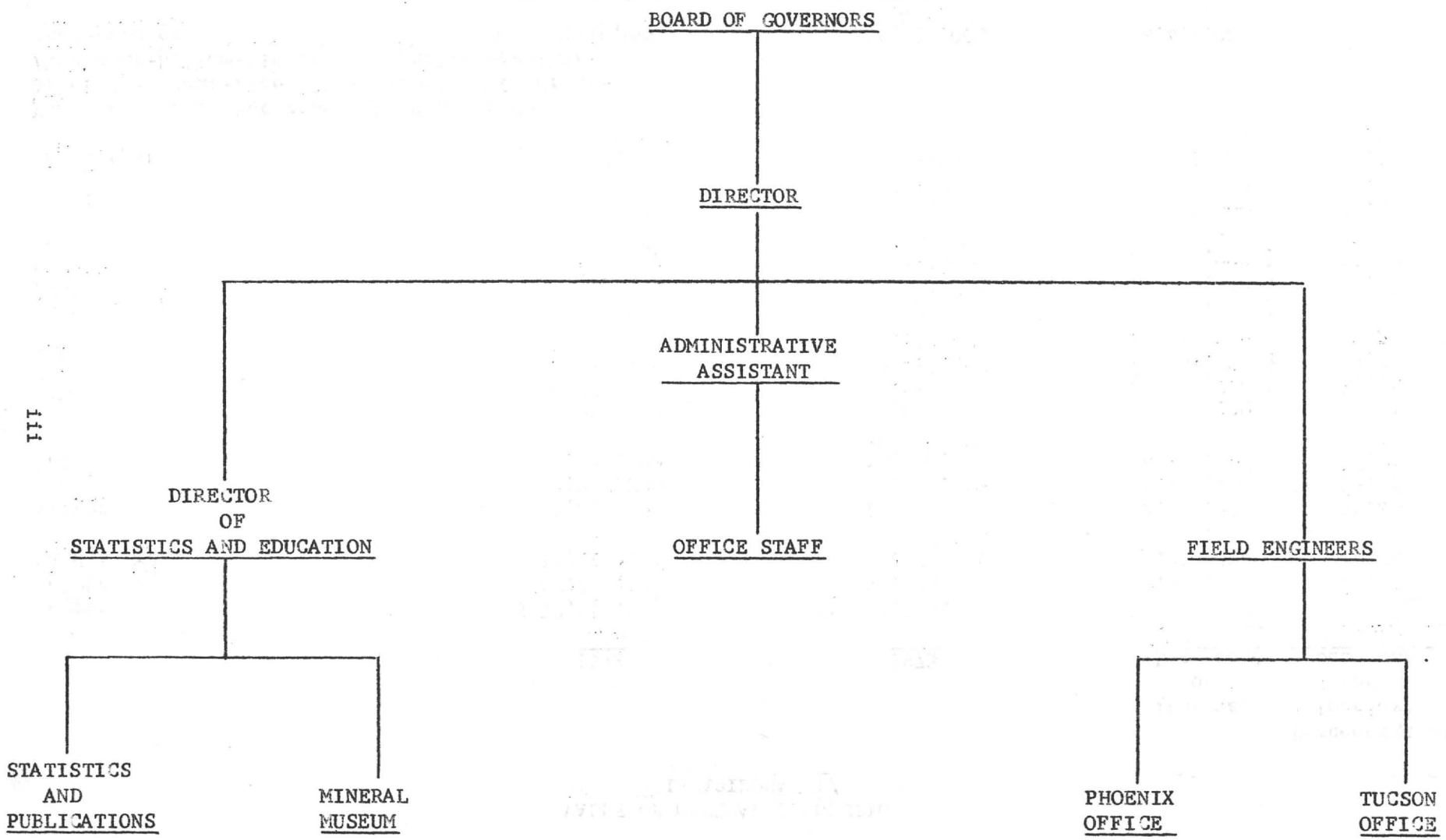
Cooperate with the Corporation Commission in its investigations and administration of laws relating to the sale of mining securities.

Cooperate with the Arizona Bureau of Mines, and deliver to the Bureau problems which the field work of the division shows to be within the scope of the activities of the Bureau.

Cooperate with federal and other agencies designed to develop mines and minerals.

Oppose congressional acts favoring reciprocal or duty free imports of foreign minerals.

Use its authority in other ways to assist in more extensive exploration and development of the mineral resources of the state.


BOARD OF GOVERNORS
DIRECTOR
ADMINISTRATIVE ASSISTANT
DIRECTOR OF STATISTICS AND EDUCATION
OFFICE STAFF
FIELD ENGINEERS
STATISTICS AND PUBLICATIONS
MINERAL MUSEUM
PHOENIX OFFICE
TUCSON OFFICE

VALUE OF MINERAL PRODUCTION IN ARIZONA 1/

	1972	1973	$$ Increase or (Decrease)	Percentage of Increase or Decrease
Copper	$930,419,000	$1,103,453,000	$173,034,000	18.59%
Molybdenum	46,791,000	59,372,000	12,581,000	26.88
Sand & Gravel	32,420,000	38,503,000	6,083,000	18.76
Silver	11,210,000	18,416,000	7,206,000	64.28
Stone	8,018,000	9,469,000	1,451,000	18.09
Gold	6,036,000	10,060,000	4,024,000	66.66
Lime	6,024,000	7,019,000	995,000	16.51
Zinc	3,589,000	3,482,000	(107,000)	2.98
Petroleum	3,226,000	3,103,000	(123,000)	3.81
Natural Gas	80,000	23,000	(57,000)	71.25
Pumice	722,000	715,000	(7,000)	.96
Lead	530,000	248,000	(282,000)	53.20
Clays	355,000	459,000	104,000	29.29
Gypsum	NA	669,000		
Gem Stones	168,000	170,000	2,000	1.19
Value of items that cannot be disclosed Asbestos-cement-fire clay-diatomite- feldspar-fluorspar-helium-mica(scrap)-perlite-pyrites-coal-iron ore	41,416,000	49,827,000	8,411,000	
TOTAL	$ 1,091,004,000	$ 1,304,988,000	$ 213,984,000	

1/ Source - U. S. Bureau of Mines

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ARIZONA MINERAL PRODUCTION

The value of Arizona's total mineral production in 1973 was $1,304,988,000. This was an increase of $213,984,000 over 1972 and was up $146,062,000 over the previous record year of 1970.

Copper accounted for $1,103,453,000 which was $173,034,000 (18.59%) increase over 1972. A complete detailed copper report is published by the Department and is available on request.

Total value of mineral production excluding copper was $201,535,000 up $40,950,000. Byproducts of copper mining include molybdenum, which was the record largest dollar producer, at $59,372,000, gold valued at $10,060,000 and silver valued at $18,416,000. Gold production was down slightly but dollar value was up over 50%.

Sand and gravel production was valued at $38,503,000 up approximately 18.76%. Stone production increased in value over 18% to $9,469,000. Lime production was valued at $7,019,000 with zinc down slightly to $3,482,000.

Metals accounted for 93% of value, non-metals 6% and mineral fuels 1%. Details of individual values and quantities are noted on page iv.

Full cash value of Arizona's producing mining properties, for tax purposes, was set at $863,267,410, down $44,132,565 (4.9%) from last year. Mineral industry employment was over 30,000 with an estimated additional 5,000 employed in construction of new plant facilities or new equipment for pollution control.

MINING ACTIVITY

A Directory of Arizona's Active Mines is a part of this annual report. It is published as a separate report and is available on request. The report lists 80 active mining operations involving 16 various commodities. Copper is involved in 35 operations. There are 17 underground mines, two strip mines and the balance are open pit mines or quarries. Projects under development are included. Small intermittently operated activities are not included. Value and production figures by commodity are given on page iv.

Every county in the state enjoys the advantages of at least one mining activity.

Sand and gravel activity is not included.

Many nonmetallic products are mined in Arizona and shipped out of the state for consumption. Production rates, number of employees and market areas are noted in the Directory.

EXPLORATION ACTIVITY

A Directory of major active exploration companies with offices in Arizona is a part of the Annual Report. It is published as a separate report and is available on request. There are 54 major companies with offices in Arizona actively prospecting and exploring for minerals. In addition to the major copper producers having separate explorations offices, there are six Canadian firms, seven large oil companies, a major wire manufacturer, the largest gold producer in the U. S., one of the largest silver producers, a major zinc producer, two iron companies, a major lead producer, and a large sulfur producer.

These exploration companies are the ones that spend the time and monies to locate, survey, test, evaluate and perhaps develop a mere hint of mineral occurrence into a potential productive mine. 1973's expenditures on this activity are estimated at $25,000,000.

DIRECTOR'S ACTIVITIES REPORT

FISCAL YEAR 1973-1974

First Quarter

The major activity affecting the Department this first quarter was the move into larger quarters in the Tucson office and adding a field engineer to the Tucson staff. A special two week report was written describing maximum possible activity from the Tucson office with two field engineers there. We hope that we can eventually add a secretary and greatly expand the library and files.

We had no authority from anyone other than the Superintendent of Public Buildings to make the move. So far we have had no objections. Neither has there been a request for rent. We are reserving monies from operating expenditures to pay the added rent to avoid requesting a supplemental appropriation. This reserving of monies is getting difficult with rising prices. We had to go outside the state contract for paper due to paper shortage and it cost us approximately 80% over monies budgeted.

Ken Phillips, in theory our statistical engineer, has been kept quite busy on many miscellaneous duties in addition to working on reports. He did turn out a directory of Rockhound Clubs (3 printings so far). We have had requests from 38 states plus Canada at last count.

A list of publications or reports issued in this quarter is enclosed. The Directory of Active Mines is a reprint of the 1972 issue. The 1973 will be issued during the second quarter.

Mr. Phillips has been working with the Arizona Rock Products Association to have the sand and gravel operators included in our active mine list. They have the same goals and problems of the mining companies and are the second largest product by dollars in the mineral industry of Arizona.

Jerry Irvin was off due to surgery all of July and part of August.

Programs were provided for Kiwanis Club, local AIME meetings and rockhound clubs. Information was provided to the newspapers, three Senators and several other state organizations. One field investigation and report was made for the State Land Department.

Meetings were held with Arizona Bureau of Mines, State Land Department and the Department of Mineral Resources. The Arizona Bureau of Mines and the Department were trying to do more mining and geological work for the State Land Department. We were almost completely unsuccessful.

The Mineral Museum was returned to the Department. Many meetings were held with Personnel Commission and members of the Flagg Foundation to resolve problems created by this move. So far the work with the Flagg Foundation to identify ownership and separate their mineral collection from the state's is progressing quite satisfactorily.

A small mineral display was set up and loaned to Northern Arizona University for a business seminar room.

The Department sponsored two half day classes for Bureau of Land Management engineers being trained as mineral examiners. The sessions included talk by members of various state organizations, ASMOA and SMEA.

With the assistance of Mr. James Richardson we were able to obtain permanent possession of a film titled "Mining Nickel". This is without a doubt the finest film available on underground mining.

Through the cooperation of Dean Lynch of Duval Corp. we obtained a copy of the film "Duval Sierrita". This is an excellent addition to our film library.

The Director and Mr. Glen Walker attended the American Mining Congress in Denver. The Director also attended a Western Governors Mining Advisory Committee meeting and a meeting of States' mining officials which was sponsored

by the American Mining Congress. Mr. Walter Heinrichs also attended this meeting.

Mr. Ronald Teissere attended the August meeting of the Advisory Commission on Arizona Environment. The Director was appointed chairman of an Ad Hoc Committee for the Natural Resources Division of the Advisory Commission. This committee is to report some of the environmental problems of the mining industry, along with proposed solutions, to the Advisory Commission.

We worked with Yavapai College in Prescott to offer a community service class in prospecting. It included two Saturday mornings of lectures and a field trip on the third Saturday, 58 attended. I was not too pleased with the results, but with what we learned and with better school cooperation we could put on an excellent class. Mr. Phillips worked long and hard on this project and deserves credit for its success. We had T.V. coverage of the field trip. This class will be written up in the Arizona Magazine and Outdoor Arizona.

One interesting call was from Business Week in Los Angeles. They requested data on silver for one of their articles. Also writers for National Geographic were in for data and photos for an article on Arizona Mining.

We purchased two new projectors and a new typewriter. The projectors were for the museum and the Tucson office.

Second Quarter

The Director spoke to a rockhound club in Apache Junction, to 140 students at Pueblo grade school in Scottsdale, and gave career counseling programs at Glendale Community College and East High School (approximately 350 students).

The Department personnel completed their lectures and field trips for the prospectors course that was taught at Yavapai College.

The Mining Subcommittee of the Advisory Commission on Arizona Environment met twice. These meetings were chaired by the Director. This group is investigating possibility of state legislation imposing some control on the Federal mining code. This is necessary if realistic "Land Use Planning" ever comes into being.

The Director is a member of the Arizona Educational Advisory Council. Final meetings were held prior to publication of a Teachers' Guide for teaching kindergarten through 8th about their environment. This has been over three years in the process. The next project is to work on a guide for high school teachers.

Other meetings attended by the Director included State ASMOA, Arizona Administrators Association, Joint Legislative Budget Committee's Finance Advisory Committee, Governor's meeting on Intergovernmental Relationship, State AIME, elected a State Director of the AIME.

A model head frame, mine cage, and a hoist were loaned to the Willcox Visitor Center at Willcox.

Used furniture was obtained from the state to furnish the Tucson office with an additional desk, chair and file.

We have been working with the Arizona Bureau of Mines in trying to locate silica with the proper characteristics for possible manufacture of mill liners. Our field engineers locate the material and the Arizona Bureau of Mines does the analysis.

A number of telephone calls were received from T.V. and radio stations and newspapers. Calls were received from several legislators in addition to the general public.

In addition to his regular duties, Mr. Phillips worked with several rockhound clubs, decorator stone inquiries, a glass company from California wanting feldspar, Scottsdale City Planning Department, a legal firm from Denver and the news media. Considerable work was done with a news reporter to assist in a feature article on the prospectors course taught at Yavapai College. Additional work was done with an outdoor magazine which published a good article with photos.

Ted Johnson, office engineer, spent considerable portion of his time with office visitors, telephone calls and letters from the general public. More unusual activity was working with National Geographic representatives, hematite for cement use, Atomic Power Plant Siting, a mercury retort design, sinking gold shaft on a small mine, abandoned quarry for special dump area, silica for a California company, Stanford Research Institute survey, Department of Commerce, leasing of claims in the Bradshaws and possible reworking of old mine dumps.

Glen Walker, field engineer, spent considerable time on a clay project, looking for new sources, sampling for analysis and in contact with possible users. Properties investigated also included limestone, sandstone, bentonite and perlite. Prospecting in this area included some exploration activity on ten copper prospects, four gold prospects, pipestone, silver, tungsten and fluorspar.

A feldspar plant is shaft sinking in preparation of ten-fold increase in production. Hydra-frac sand production has increased but bentonite shipments are down due to lack of railroad cars. The mica processing plant has increased production and the salt mine is working at capacity. A gold mill is being planned in this area.

One item of unusual interest is an experimental joint venture between the U.S. Bureau of Mines and El Paso Natural Gas. The project is a cooperative venture to drill holes and in-situ leach the extension of the Emerald Isle mine.

The Tucson engineers moved into their new offices in September. With new offices and two engineers, it is possible to now consider this office a branch office rather than a field office. As a field office, it was open approximately one third of the time. As a branch office or Tucson office, we will attempt to keep it open all the time. This will not be completely possible until such time as we are able to obtain a full time secretary.

With two engineers and the office open most of the time, office visitors and telephone calls increased considerably. Brokerage houses, USDA, Tucson City Planning, Forest Rangers and Stanford Research Institute were some of the more unusual visitors.

Field contacts and activity include drilling and prospecting for copper prospects, two lead-zinc prospects, three gold prospects, three silver prospects, one each of silica, tungsten, fluorspar and clay.

Uranium interest, for the first time in several years, was noted by a German concern locating claims, a New York firm leasing the Anderson mine for possible leaching and the department sampling some prospects.

A German firm is evaluating the iron deposits south of Florence. Prospect drilling in the Organ Pipe National Monument does not appear to be encouraging at this time.

Third Quarter

The Director attended the American Mining Congress Convention in Denver. Concurrent with the meeting, Western Governors Mining Advisory Committee and the Association of States' Mining Officials held their meetings which the Director attended.

Official meetings with other state agencies included Financial Advisory Committee (for Staff economist of Joint Legislative Budget Committee). Interagency Economic Coordinating Council and the Governor's meeting on budget reduction. In addition informal meetings were held with members from various other governmental agencies including the Department of Revenue, Luke Airfield Base (relating to mineral survey of air force land reservations) and Corps of Engineers (minerals on government land reservations).

Programs were worked out with Roosevelt School District to participate in the Federal funded "mini-course" programs. These are awareness programs for junior high students. It relates to an activity that could be either a

hobby (craft) or career. Minerals is a natural for this. The Director and Ken Phillips spoke at several schools on this program and it is continuing. Field trips to the museum resulted from this activity, since it was federally funded.

The Director and Ken Phillips each spoke to 5 different classes (10 total) at a junior high school in Yuma. This was for a school career day.

The Director attended the Advisory Commission on Arizona Environment meeting and later conducted a mining subcommittee meeting.

The Director spoke to a group (Epsilon Sigma Alpha) in Mesa, a Scottsdale junior college group and arranged for a speaker at the Arizona Council of Engineers meeting.

Miscellaneous activity of the Director included meeting with local bus companies for special field trips to the museum for elementary school children, obtained a coal display from Peabody Coal for the museum, dedication of Sacaton Unit of ASARCO and three newspaper reporters.

Some of the more unusual inquiries to the Director included Atlas Minerals of Denver wanting a supply of acid, taconite inquiry, Australian mine operator looking for used machinery, two Canadian companies wanting properties, First National Bank of New York, General Superintendent of Phelps Dodge, Tyrone mine, and zeolite inquiries.

The gas shortage had its effect on our operations this quarter. We were requested to submit "plans of operations" with a 25% reduction in travel and one with a 50% reduction. Plans were submitted. Later, the Governor's office requested we implement the 25% reduction. Later, the Governor called a meeting of Department Heads and requested a 5% savings (return of monies) from our operation. Attached copies of reports submitted show how we have or are trying to reduce expenditures with the year almost two-thirds past, with most of our budget as personnel funds and no personnel turnover, the requested savings are difficult if we are to keep any degree of field operation.

Field Engineer Glen Walker continued his work on clays and nonmetallics. Several requests involving limestone deposits were received. A perlite project resulted in some locations of new deposits which were ultimately staked by an operator who plans a "popping plant" in Phoenix. Tan clay, asbestos, kaolin and vermiculite were included in the investigation.

Four Canadian firms consulted Mr. Walker. He was also consulted on magnetite marketing, fire agate, gold, silver, fluorspar, stibnite, strontium, in addition to the usual copper, lead and zinc. A gold panning lesson was given to a newspaper reporter; he attended Organ Pipe Cactus National Monument hearings, worked with "small miners" to make them aware of Kofa Game Range and Cabeza Prieta hearings, the usual field activities and mine visits were made.

Polaris Mining from Denver, Royal Agassiz -Toronto, Santa Sarite Mining - Vancouver, Acoma Properties - Vancouver, Dames and Moore - Los Angeles, Getty Oil Company - Salt Lake City, Monsanto Corp. all were companies consulting Field Engineer Walker.

Field Engineer Johnson is used more as an office engineer. Due to the great number of visitors it is almost mandatory we keep an engineer in the office at all times if possible. His vast knowledge of mineral resources and good mineral identification capability makes Mr. Johnson an excellent choice. One of his most interesting inquiries involved possiblity of Arabian money erecting a platinum refinery if enough reserves could be located. Real Estate agencies wanting to sell mining claims, placer mining information including where and how, iron deposits, bismuth, Motorola for glass grade quartz, coal inquiries, mica for dilling mud, beryllium marketing, OME loans, lithium, scandium, calcite marketing, fluorspar and land ownership were all discussed with various office visitors. In addition Cerbat Minerals Company - Kingman, Holmes and Narver conducting U_3O_8 vat leaching tests, Whitelock Corp. mill - Wickenburg, Cutlass Exploration - Canada and Kaiser Exploration company consulted with Mr. Johnson.

Ken Phillips is doing much work outside of the "mining research analyst" duties as originally scheduled. He set up and participated in a course at Grand Canyon College on prospecting. He spoke to five classes in Yuma, Scottsdale Gem and Mineral Society, several 5-6 grade classes in Phoenix and to the Arizona Association of Earth Science Clubs. He requested this group to provide the mineral museum with displays relating to earth science or rockhound activity. Mr. Phillips has made and printed a directory of the earth science clubs in Arizona. So far we have received requests for this publication from approximately 40 states and Canada. In addition, Mr. Phillips provided a summary of State Legislative bills introduced that could effect mining, published a copper report, assisted Huachuca Gem and Mineral Club for a field trip, worked with a new prospectors association forming, did some work on a long range silver report, started a mineral resource map of the Kofa Game Range to use in defending the area from withdrawal and participated in some field work in investigating a tuff plant which is bagging the material at the mine site and obtaining informtion on scandium availability in Arizona.

The activity of the Tucson office has increased considerably. This, of course, is due to adding to the staff and trying to keep the office open five days a week.

Field engineer Irvin made a presentation to the Tucson League of Women Voters and to the Tucson Subsection of AIME. Conferences or meetings were held with or information was furnished to the following agencies: Pima County Assessor's Office, Forest Service Proposed Regulations, Tucson Zoning Department, State Legislative Committee hearings, Tucson Water Department and Tucson Chamber of Commerce. Several real estate companies, an investment company and Spreckles Lime consulted with engineer Irvin. Miscellaneous office visitors wanted information on patenting claims, land status, claim validity, state mineral leases, Organ Pipe National Monument, coal gasification, mine

taxation, silver mines (locations and possibilities), block caving, placer gold, mine dust control, strip mining, marketability of lime, pumice, SO_2 effects on vegetation and leach of manganese ores, rockhounds, Kofa Game Range and the Cabeza Prieta Game Range, Geo-Thermal drilling, metal prices and fluorspar. Data was furnished to two newspaper reporters.

Field Engineer Lehner spent considerable time in researching and making a study on commodities. From the study it will be determined what priorities to establish. Work on a general information uranium status report. Work was also done on a proposed planning unit area for the Bureau of Land Management. A resource map was made on the study area. Work was begun on a base mineral resource map for Pima County. A base map had to be created, then the resources plotted on an overlay. The State Land Department furnished data on state sand and gravel leases so they could be included. Meetings were held with Arizona Rock Products Association trying to obtain data on privately held sand and gravel areas so they could be included on the resource maps. A most welcome addition to our files were ten mine reports written by Mr. Lehner. Office visitors resulted in discussions of mineral rights, oil shale, mineral collecting, Tucson withdrawal areas, claim validations, mineral ownership, mining guidebook, new opal mine, an Australian looking for small properties in order to buy the equipment, siliceous gold ores and potential copper properties.

Due to lack of space and lack of proper equipment, Mr. Lehner was forced to work on maps at his home and use his personal equipment. Even if he so wanted, the equipment could not be moved to the office due to lack of space.

Fourth Quarter

The Director made a presentation at the Glendale Community College, Scottsdale Junior College, two classes at Arizona State University, and at schools in San Manuel, Kingman and Scottsdale and two elementary schools in Phoenix. Meetings attended included Advisory Curriculum Committee (Scottsdale

Jr. College) WGMAC, Joint Legislative Budget Committee's Finance Advisory Committee, Subcommittee on Mining (Advisory Commission on Arizona Environment) and State meeting of ASMOA.

One meeting attended of particular interest was the initial meeting of "Arizona Prospectors Association". This is a new group and I expect it to experience good growth.

R. Lehner, Tucson field engineer, resigned in June to take a position with Freeport Minerals. We have a replacement but will not have him come to work until the first quarter of the next fiscal year. Mr. Lehner's short presence will be felt long after he has gone. We will miss his expertise.

The department was requested to testify before the Environmental Commission on how the department would fit into environmental activities. This was done.

Mr. Vernon Dale donated an arrastra to the department. It is located out at a mine. No decision has been made as to its acceptance or disposal.

The Governor requested that all state agencies try to refund 5% of their 1973-1974 budget. This was extremely difficult for us since two-thirds of the year had already passed. By reducing travel, eliminating plans for some publications, reducing office expenditures we were able to end up with a 3.9% reduction. These are reflected in the year end financial statement.

A request was submitted to the U. S. Bureau of Mines for contract to do commodity studies for their "minerals availability system". We were given verbal assurance our chances were excellent.

Phelps Dodge Corporation furnished the department with 500 reprints of an ad that has been running in national magazines. It features the mineral museum. They will be used in our efforts to get schools to schedule field trips to the museum.

Mineral Resource maps of the Phoenix and Tucson area were completed. They were well received by the Environmental Commission, a legislator, and Pima and Maricopa County Planning and Zoning agencies. The maps need only the addition of the privately held sand and gravel areas to be complete.

Engineer Ken Phillips attended hearings, gave oral testimony and presented written data on the proposed Kofa withdrawal and the BLM Vulture Planning Unit. Other activities included judging a State 4-H geology and mining exhibit, working with Arizona Prospectors Association to get organized, wrote monthly column for Outdoor Arizona, assisted Phelps Dodge Corporation prepare a mineral specimen to be presented to the King of Saudi Arabia, assisted a shopping center request for Gem and Mineral club display, made numerous mineral identifications, and made a presentation to Yavapai College. Mr. Phillips donated his stipend for this to the department by purchasing a book for the library.

Visitors to the office consulting with Mr. Phillips included people with questions concerning a barite vein with silver, oil shale sample, probable platinum, gold and silver mill, electro-chemical platinum recovery processes, plasma generator for gold recovery, chrysocolla and turquoise identification, Canadian inquiry on mine tailings. One Canadian company commented to Mr. Phillips on the great number of "fast buck operations" from Canada operating in Arizona. We are aware of their existence but have no details on their operations.

Engineer Ted Johnson functions were as an office engineer. He does make an occasional trip to the field for specific purposes. He discussed over 30 specific properties with office callers. Other contacts required assistance on information regarding smelters, newspapers, recovering gold from amalgam, core drill costs, platinum assayers and problems, Answer Line, mineral rights on deeded land, sampling, claim locations and relocations. Commodities dis-

cussed included kaolinite, calcite, coal, quartz of glass making quality, fire clay, gold placers, turquoise, magnetite pellets for powdered iron, quartz crystals mistaken for diamonds, hematite, asbestos, pumice, uranium, limestone, Fuller's earth, perlite, nitrates, bismuth, mercury and iron placers.

Mr. Johnson attended public hearings by the BLM on the Vulture Planning Unit held in Wickenburg. He reviewed the written data on same and environmental impact statement on Federal Coal Leasing. Cullas Mining Company and Consolidated Fortune Ltd., were two of the Canadian companies consulting with Mr. Johnson.

Field Engineer Walker discussed with potential users or miners the following minerals: bentonite, black sand, perlite, lead-silver, pozzolan, copper, pyrophyllite, asbestos, gold in schist, manganese, cinnabar, gypsum, zinc, hematite, white volcanic tuff, marble, mica, rare earths, and limestone. How to stake claims, assessment work, restrictions on open pit mining, how to build gold amalgam mills, remodeling of placer operations and proper sampling procedures were some of the subjects requiring Mr. Walker's assistance. Mr. Walker is working with the State Historical Society trying to obtain a good stamp mill for display in the new mining wing of their museum. Mr. Walker did work on a proposed Bureau of Mines Mineral Availability System. The State Corporation Commission and a radio station requested his assistance. Mr. Walker has had a continuing clay evaluation program going. He has been sampling deposits and submitting samples to the Building Products Co. (APS) for analysis. However, they recently told Mr. Walker that the lab had orders not to give the department any more definitive information. This has stopped our clay project at this time. We cannot get a reason for the sudden change for Building Products Company. Mr. Walker attended a U. S. Geological Society meeting on digital land use planning and several ASMOA meetings.

Mineral rights, with and without subsurface rights, surface rights, how to locate claims, assessment work and patenting claims were the subjects of many of the requests for information from Field Engineer Irvin. In addition, data or assistance was provided by Mr. Irvin to League of Women Voters, Pima County Recorder's Office, Tucson Chamber of Commerce, Attorney General's Office, City Planning Commission, Pima Association of Government. Minerals discussed with prospectors and exploration companies included perlite, chabazite, gold, copper, lime and silica. Where to mill ores and the experimental leaching system - marconaflo - resulted in many inquiries. Engineer Irvin presented programs to classes of 8th graders at Oracle. Trend Exploration Company from Sydney, Australia and Rio Tinto from Canada were some of the foreign companies contacting the Tucson office in addition to the usual ones located locally. Requests on 21 specific properties and 10 different companies were received and answered.

Field Engineer Lehner spent much of his limited time working on the Phoenix Area Resource overlay maps. He did attend meetings with Rock Products Association and with Arizona Resource Information Center on Information systems. Additional work was done in the uranium status report but unfortunately ran out of time. Mr. Lehner had discussions on locating claims, land status in Cochise County, electrolytic refinery, copper leaching, proposed Kofa withdrawal and general exploration with office visitors.

Many inquiries are being received from many people who either come in or telephone, who have clients back east with worlds of money wanting us to tell them where they can invest the money. Many inquiries are from local people requesting information on investing in certain properties. Unfortunately many call after they have lost many thousands of dollars. The platinum scheme is still around and quite active. One bank in Missouri was taken for considerable money. Again they called us after the fact. Being a non regulatory agency, we cannot wear black or white hats but we do try to assist all who request help on propositions to invest in claims or mines.

STATISTICAL OPERATING DATA

Office Visitors, Phoenix and Tucson	2,234
Telephone calls, Phoenix and Tucson	5,799
Letters written	2,485
Photo copies from mine files, technical publications, etc. made for office visitors	6,500
Publications:	
Directories	8
Reports	3
Information Circulars	5
News Release	5
Miscellaneous	6
Publications distributed	13,146
Field Activities:	
Arizona Small Mine Operators' meetings and other meetings	88
Mine visits	129
Field contacts	341
Mine reports written	56

STATEMENT OF EXPENDITURES

APPROPRIATION - Fiscal 1973-1974		$173,000.00
EXPENDITURES		
Personal Services	$ 129,999.62	
Employee Related Expenditures	16,937.54	
Travel - State	6,546.65	
Travel - Out of State	778.48	
Other Operating Expenditures		
Utilities	2,203.19	
Mtnce. & Supplies	1,698.23	
Telephone	2,104.14	
Subs., Dues & Pubs.	781.82	
Insurance	71.00	
Postage	967.20	
Printing	86.84	
Registration Fees	43.00	
Rent	600.00	
Office Supplies	1,868.09	
Other Supplies	92.57	
Total	$ 164,778.37	
Capital Outlay	1,393.47	
TOTAL EXPENDITURES		$166,171.84
Balance - returned to General Fund		6,828.16
		$173,000.00

MINERAL MUSEUM

At the beginning of the fiscal year, the Arizona Mineral Museum was returned to the jurisdiction of the Department of Mineral Resources. This first year of operation has been one of trying to get the museum oriented in a full direction of education, establishing a plan of operation and to, as far as possible, re-design the museum layout for better light, flow of traffic and security.

The last few years of operation had seen the museum turned into a warehouse for some private collections, including not only minerals but equipment as well. The upstairs mezzanine was lost for displays due to storage.

After many months of work by seasonal employees and Flagg Foundation members, all minerals and other items were sorted, identified and those not belonging to the Museum moved out. Many thousands of specimens were moved.

Cataloging of specimens was resumed after many years of neglect. Locating of previously cataloged items was started.

The energy shortage and having to close on weekends resulted in a decrease in attendance. However, weekend opening will resume next year.

The curator resigned in June and had not been replaced by fiscal year end.

STATISTICAL OPERATING DATA

Visitors, including clubs and school children	12,744
Telephone calls	2,799
Publications:	
Information circulars	3
Miscellaneous	2

STATEMENT OF EXPENDITURES

APPROPRIATION - Fiscal 1973-1974		$ 24,000.00
EXPENDITURES		
Personal Services	$ 17,392.09	
Employee Related Expenditures	2,428.21	
Other Operating Expenditures		
Telephone	329.41	
Office Supplies	4.98	
Maintenance & Supplies	66.16	
Other Supplies	30.00	
Total	$ 20,250.85	
Capital Outlay	577.20	
TOTAL EXPENDITURES		$ 20,828.05
Balance - carried forward		3,171.95
		$ 24,000.00

This section of the Annual Report of the Department of Mineral Resources is presented as a separate publication in order to make it available to the large number of people that request a Directory of Active Mines but have no need for other sections of the Annual Report. This is done in the interest of conservation of paper and printing supplies.

Other sections of the report are available to those that have need of them.

VALUE OF MINERAL PRODUCTION IN ARIZONA 1/

	1972	1973	$$ Increase or (Decrease)	Percentage of Increase or Decrease
Copper	$930,419,000	$1,103,453,000	$173,034,000	18.59 %
Molybdenum	46,791,000	59,372,000	12,581,000	26.88
Sand & Gravel	32,420,000	38,503,000	6,083,000	18.76
Silver	11,210,000	18,416,000	7,206,000	64.28
Stone	8,018,000	9,469,000	1,451,000	18.09
Gold	6,036,000	10,060,000	4,024,000	66.66
Lime	6,024,000	7,019,000	995,000	16.51
Zinc	3,589,000	3,482,000	(107,000)	2.98
Petroleum	3,226,000	3,103,000	(123,000)	3.81
Pumice	722,000	715,000	(7,000)	.96
Lead	530,000	248,000	(282,000)	53.20
Clays	355,000	459,000	104,000	29.29
Gem Stones	168,000	170,000	2,000	1.19
Value of items that cannot be disclosed Asbestos-cement-fire clay-diatomite-feldspar-fluorspar-gypsum-helium-mica(scrap)-perlite-pyrites-coal-iron ore-natural gas	41,496,000	49,827,000	8,331,000	22.48
TOTAL	$ 1,091,004,000	$ 1,304,296,000	$ 213,292,000	

1/ Source - U. S. Bureau of Mines

AMERICAN SMELTING AND REFINING COMPANY (ASRACO)
1150 N. 7th Avenue, P.O. Box 5795, Tucson 85703 - Phone 792-3010

North American Mining Department
General Manager.....Norman Visnes
Ass't. General Manager.....Charles W. Campbell

Southwestern Mining Department
Manager.....R. B. Meen
Ass't. General Manager.....Thomas E. Scartaccini

Ore Purchasing Department
Manager.....Tony Kroha
Ass't. Manager.....James N. Lambe
Admin. Ass't.....Marge Hinton

Mineral Beneficiation Department
Director.....Donald E. Crowell
Ass't. Director.....Thomas D. Henderson

Hayden Unit
Hayden 85235 - Phone 356-7717
Copper Smelter Cap. 960,000 TPY - Acid Plant Cap. 1,000 TPD - Empl. 450

Manager.....M. J. Winkel
General Supt.....M. A. Sharp
Ass't. General Supt.....Thomas L. Jordan
Plant Engineer.....L. DiPastena
Purchasing Agent.....K. C. Newman

Mission Unit
Box 11, Sahuarita 85629 - Phone 622-4891 (Tucson)
OP Mine - Concentrator - Leaching Plant - Employees 787
Production: T Ore 8,783,000 - T Copper 46,600 - Oz. Silver 571,000

Supt.....Roy S. Herde
Ass't. Supt.....S. L. Burrill
Mine Supt.....William D. Gay
Ch. Engineer.....G. H. Bloomfield
Ch. Geologist.....L. J. Jansen
Mech. Supt.....C. W. McClain
Purchasing Agent.....F. P. Hearne

San Xavier Unit
Copper Leach operated by Mission Unit
Production: 12,000 TPY Copper in Precipitates

Sacaton Unit
P.O. Box V, Casa Grande 85222 - Phone 836-2171
OP Mine - Concentrator - 21,000 TPY Copper in concentrates - Empl. 390

Mill Supt.....Dennis K. Mortensen

AMERICAN SMELTING AND REFINING COMPANY (ASARCO) Con't.

Silver Bell Unit

Silver Bell 85270 - Phone 622-6751
OP Mine - Concentrator - Leach - Employees 417
Production: Ore 3,865,100 T - Cu 23,800 T

Supt.....D. R. Jameson
Ass't. Supt.....W. T. Barlow
Ch. Engr.....R. A. Barnes
Mill Supt.....B. L. Rickman
Mech. Supt.....Burr Marley
Purch. Agent.....C. R. Henry

THE ANACONDA COMPANY

Natural Resources Group

P.O. Box 27007, Tucson 85726 - Phone 889-5361

President.....Robert C. Weed
Exec. V.P.....A. J. McDonell
V. P. Operations.....Martin Hannifan
V.P. & Ch. Geol.....G. A. Barber
V.P. Pub. Rel.....C. J. Hansen
Director of Met. Res.....Nathaniel Arbiter
V.P. Planning.....J. W. Bosse
Per. Director.....Frank Welch

ANAMAX MINING COMPANY

Twin Buttes Operations

P.O. Box 127, Sahuarita 85629 - Phone 625-4414 & 623-4341
OP Mine - Concentrator - Employees 1850
Production: Ore 10,892,000 T - Copper in Concentrates 61,712 T

President.....E. J. Eisenach
V.P. Production.....F. J. Balentine
V.P. & Mgr. Eng. & Planning.....P. A. Hodges
Ch. Counsel.....C. E. Stott
Director of Acc't.....T. B. Glennon
Met. Manager.....Frank Windolph
Manager of Maint.....Don Dunmire
Mine Manager.....P. W. Erickson
Supt. Sulp. Conc.....H. A. Astlett
Ch. Mine Engineer.....B. Koskiniemi
Ch. Chemist.....D. E. Wood
Land Manager.....D. F. Kittel
Safety Manager.....G. H. Johnson
Ch. Geol.....J. L. Kelly
Manager Construction.....H. G. King
Dir. Purch. & Traffic.....E. H. Gurton
Dir. Ind. Relations.....H. Ashby

$200 million expansion program will increase production of Cu to 130,000 TPY. The expansion program will include expanding existing facilities to 40,000 TPD adding an oxide ore treatment plant and a new power plant.

ANDRADA MARBLE COMPANY

639 N. Columbus Blvd., Tucson 87111 - Phone 327-8387 & 279-8361
Plant at 4901 E. Drexel Road - Quarry is 6 miles S. of Vail
Production: 200 TPD Marble - Employees 12
Products: $CaCO_3$ for feed additives - roofing material - plaster

President.....D. C. Hartley

ARIZONA FELDSPAR CORP.

P.O. Box 229, Kingman - Phone 753-2094
UG Mine - Mill - Employees 7
Product: Feldspar for ceramic and glass industry in California and foreign markets

Mill Supt.....S. Juntunen
Mine Supt.....J. Easton

ARIZONA PORTLAND CEMENT COMPANY

General Delivery, Rillito 85246 - Phone 622-3503
Plant & Quarry - Lime-Cement - Employees 250
5,300,000 bbl Kiln Cap. - 6,000,000 bbl finish grind cap.

Plant Manager.....Frank Thornberry
Plant Chemist.....J. Boyette
Plant Engineer.....Mike VeerKamp
Ch. Electrican.....Jack Meeler
Office Manager.....Ken Kroger

ARIZONA SILICA SAND COMPANY

P.O. Box 108, Houck 86506
OP Mine - Plant south of Houck - 12,000 TPY - Employees 9
Hydrafrac sand - Oil well fracturing, markets include Texas, Wyoming and New Mexico

President.....Del W. Fisher
Vice President.....Robert Fisher
General Supt.....Elmer J. Gilstrap

BIG HOLE MINING COMPANY

United Verde Pit

P.O. Box 125, Jerome 86331 - Phone 634-5018
OP Leach - Direct Shipping - Employees 6

General Manager.....R. H. Gemmill

BUCKEYE MICA COMPANY

P.O. Box 416, 228 Arizona Eastern Street, Buckeye 85326
Phone 386-4451 - Mine west of Buckeye, mill at Buckeye - Employees 6-8
Mica used in Paints, Roofing - California major market

President.....R. N. Avery
General Manager.....H. G. Smith

CITIES SERVICE COMPANY

Miami Copper Operations

P.O. Box 100, Miami 85539 - Phone 473-2441
Open Pit - Concentrator - In-situ leach
Total Miami Copper operation employment - 745
Tons Ore mined 5,223,000, Total Copper produced 29,206 tons

General Manager.....C. T. Brown
Operation Manager.....R. P. Hughes
Manager Adm.....G. C. Nichols
Ind. Relations Manager.....D. D. Rickabaugh
Supt. of Operations.....G. E. Napp
Ch. Metallurgist.....A. D. Kennedy
Leach Supt.....W. F. Sloan
Ch. Design Engineer.....G. T. Colgate
Research Geol.....J. E. Fowells
Mech. Dept. Coord.....N. B. Gillespie
Gen. Maint. Foreman.....C. R. Miller
Purch. Agent.....R. H. Lacy

Miami East - UG development

2,000 TPD anticipated - Production start late 1974
Project Manager.....John Brandon

Pinto Valley Operations

P.O. Box 727, Miami 85539
40,000 TPD anticipated - 1975
Project Engineer.....V. E. Sicks
Metall. Coord.....W. D. Gould
Con. Supt.....W. G. Slack
Mining Coord.....J. J. Spencer
Project Engineer.....C. E. Chiasson
Purch Coord.....J. DeMars
Labor Rel. Coord.....C. S. Parker

CONTINENTAL COPPER, INC.

Control Mine

P.O. Box 662, Oracle 85623 - Phone 896-9500
UNDER DEVELOPMENT UG Mine - Concentrator, Mine 20 miles S. Oracle

Vice President Mining.....C. H. Reynolds
General Supt.....John G. Roscoe
Ch. Geologist.....John Fritts

CONTINENTAL OIL COMPANY MINERALS DEPARTMENT

Florence Project

P.O. Box 744, Florence 85232 - Phone 868-4664
Mine at Florence - UNDER DEVELOPMENT

Project Manager.....A. F. Bissett
Sr. Mining Engineer.....Frank H. Buchella Jr.
Project Geologist.....Phillip W. Nason

COPPER HILL MINE (formerly Moores Silica)
Box 752, Globe 85501 - Phone 425-7006 - Employees 2-3
250 TPD Silica flux for copper smelters

Contractor.....Charles Nichols

CYPRUS MINES CORPORATION
Arizona Operations
2343 E. Broadway Suite 207, Tucson 85717 - Phone 624-3245

V.P. & General Manager.....W. J. Rundle
Project Engineer.....Robert Clayton
Exec. Sec.....Mary V. Wood
Geologist.....Nora Colburn

CYPRUS BAGDAD COPPER COMPANY
55 East Thomas Road, Phoenix 85012 - Phone 263-9407
President.....David C. Lincoln
Mine @ Bagdad - Employees 526
P.O. Box 245, Bagdad 86321 - Phone 633-2241
OP Mine - Sulphide Conc. - S-X Plant & Electrowinning
Production: 2,088,074 T Ore milled, 11,011,020 T Waste (estim.)
24,000 T in Conc., 500,000 lb. moly, 46,700 oz. Silver,
7,135 T cathode copper

V. P. & General Manager.....R. C. Bogart
Mine Supt.....R. J. Bonnis
Leaching Supt.....R. L. Jones
Mill Supt.....A. G. Austin
Research Director.....E. S. Howell
Purchasing Agent.....E. Kellis
Comptroller.....J. C. Ryan

CYPRUS BRUCE COPPER & ZINC COMPANY
Bruce Mine (Old Dick)
P.O. Box 457, Bagdad 86321 - Phone 633-2331
UG Mine - Concentrator
Production: 6,000,000 lb. Cu in conc. - 19,000,000 lb. zinc, 93,000 T ore

Resident Manager.....Keith E. Dyas
Mine Supt.....G. H. Stoffers
Mill Supt.....C. W. Pilz
Ass't. Mine Supt.....R. T. Johnson
Mine Engineer.....R. Madrid
Mech Foreman.....H. Sharff
Purchasing Agent.....F. C. Wetlaufer

CYPRUS JOHNSON COPPER COMPANY
P.O. Drawer "R", Benson 85602
DEVELOPMENT - anticp. 4,000 TPD production start early 1975

Resident Manager.....J. O. Sierakoski
Mining Engineer.....Rogelio L. Caculitan
Office Manager & Purch. Agent.....D. L. Zimmerman

CYPRUS PIMA MINING COMPANY

Pima Mine

Pima Mine Road, P.O. Box 7187, Tucson 85725 - Phone 792-1200
OP Mine - Concentrator - Mine & Mill 12 miles S. of Tucson
Production: 20,321,000 T Ore, 88,146 T Cu, 898,000 oz. silver
1,875,000 lbs. moly
Employees 1100

V. P. & General Manager.....G. A. Komadina
Resident Manager.....M. D. Martin
Mill Manager.....J. H. Bassarear
Mine Supt.....M. W. Hood
Ch. Geol.....Don R. Williamson
Mech. Supt.....M. H. Nicholson
Research Dir.....R. O. Huch
Purch Agent.....J. L. Timmons
Mill Supt.....H. W. Sorstokke
Elec. Supt.....A. G. Beebower
Dir. Ind. Relations.....R. J. Calderwood
Ch. Metall.....P. Valles
Ch. Engineer.....Harold Bailey
Ass't. Dir. of Ind. Rel.....R. P. Sparks
Agronomist.....Ken Ludeke

DEMMING MINING COMPANY

Antelope Mine

Why 85321 - Phone 387-6240 - Employees 3
OP Mine 100/T day - Silica flux for copper smelters

DUNBAR STONE COMPANY

P.O. Box 246, 716 Lewis, Ashfork 86320 - Phone 637-2592
Plant @ Ashfork - Employees 25
Flagstone, sand & gravel, Redimix - Decorative Flagstone sold in and out of state

President.....G. E. Dunbar
Vice President.....Warren B. Dunbar

DUVAL CORPORATION

Tucson Office

4715 E. Ft. Lowell Road, Tucson 85712 - Phone 327-5941

President.....G. E. Atwood
V. P. Operations.....D. J. Bourne
Ex. V.P. - Houston.....A. E. Smith
V.P. Development.....E. D. Bowman
V.P. Min. Acq.....R. A. Hardy
Manager Process Tech.....R. W. Livingston
Dir. Ind. Rel.....M. H. Campbell
Manager Mining Methods.....J. F. Shahan
Manager Elec. Engineer.....A. T. Jones
V.P. Special Proj.....D. E. Cochran

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DUVAL CORPORATION (Con't.)

Tucson Office

Dir. Health & Safety.....A. Daniels
Manager Maint. Methods.....W. H. Long
Manager Mining Planning.....T. Jancic
Manager Materials.....G. R. Kemp
Pub. Rel. Director.....Dean Lynch

Mineral Park Division

P.O. Box 1271, Kingman 86401 - Phone 565-2226
7 miles N. of Kingman - OP Mine - Conc. Leach Plant - Employees 405
Production: 6,755,000 T Ore, 26,460 T Cu

Resident Manager.....W. J. Roper
Mine Supt.....K. K. Kelley
Mill Supt.....R. McLean
Mine Engineer.....G. P. Boone
Mine Geologist.....R. Teissere
Maint.Supt.....O. G. Bennett
Purchasing Agent.....G. F. Cummins

DUVAL AND DUVAL-SIERRITA CORP.

Esperanza and Sierrita Properties

P.O. Box 125, Sahuarita 85629 - Phone 624-8891
32 miles S. of Tucson - OP Mines - Concentrator - Employees 2130
Production: 36,943,000 T Ore - 94,546 T Copper

General Manager.....T. H. Pate
Milling Manager.....C. G. Janes
Plant Maint. Manager.....A. E. Shiell
Mining Manager.....H. L. Shively
Mine Prod. Supt.....K. L. Lamb
Mill Supt.....R. L. Bevers
Mine Geologist.....C. D. Iles
Admin. Ass't.....J. K. Peters
Mining Engr. Supt.....L. G. Dykers
Mine Maint. Supt.....R. J. Arnold
Purchasing Agent.....R. Ivey

EL PASO NATURAL GAS COMPANY

Emerald Isle

P.O. Box 1313, Kingman 86401 - Phone 565-4888
OP Mine - LPF Plant, 12 miles N. Kingman - IN-SITU LEACH DEVELOPMENT

Plant Supt.....Les Mead
Ch. Chemist.....Glen Butt
Prod. & Maint. Leadman.....Clifton Combs

FILTERS INTERNATIONAL INC.

Chicago Pit (Old Cluff)

Rt. 1, Box 720, Miami 85539
Plant @ Superior - OP Mine 2 miles SW of Superior - Employees 6-8
Perlite - Major market in California and Texas - Construction Industry

General Manager.....Lewis Williams
Supt.....Buster Williams

FILTROL COPRORATION

Cheeto No. 2

Sanders 86512
OP Mine - 2 miles E. Sanders - Employees 14
1800 TPM Bentonite - Filtering Industry, California major market

General Supt.....Alden Jack

FLAGSTAFF CINDER SALES, INC.

Wildcat Hill Pit

P.O. Box 2796, Flagstaff 86001 - 5 miles NE Flagstaff - Employees 13
250-300 Cu. yd/day Cinders - Aggregate Industry

Manager.....Bob Ollivie

THE FLINTKOTE COMPANY

U. S. Lime Division - Nelson Quarries & Plant

P.O. Box 197, Peach Springs 86434
Quarry and plant at Nelson - Employees 12
80 TPD output, expansion to 800 TPD completion late 1974
Lime for processing and building industry, marketed in California and other states.

General Supt.....Mr. Bravo

GILBERT CONSTRUCTION COMPANY

204 East Vista, Warren & P.O. Box 5288, Bisbee 85603 - Phone 432-2078
Quarry 3 miles E. Paul Spur, Mobil phone 458-8804 - Phone 642-3337
Silica flux 600 TPD for copper smelter - Employees 17

President.....A. J. Gilbert, Jr.
Vice President.....A. J. Gilbert, III
Mining Supt.....Dan Keller
Mech. Supt.....W. Whisman

GURLEY BENTONITE MINE

Cheeto No. 1

Sanders 86512 - Employees 2
OP Mine 2 miles NE Sanders
4-500 TPM bentonite - Filtering Industry, California major market

Mine Supt.....J. A. McDonald

GUZMAN CONSTRUCTION

P.O. Box 7, Superior 85273 - Phone 689-5575
Plant at Superior - OP Mine 2 miles W. of Superior
Perlite - Employees 3-5

HARBORLITE CORPORATION

Mary Ann Mine

Superior 85273 - Mine & Plant west of Superior
Employees 3 - 400 TPW Perlite for construction industry, major market in Texas

Manager.....Homer Spencer

HECLA MINING COMPANY

Lakeshore Mine

P.O. Box 493, Casa Grande 85222 - Phone 836-2141
30 miles S. Casa Grande - Employees 1150
UG Mine - Concentrator - Roast-Leach - Electrowinning Plant
Vat Leach precipitate - Sponge Iron Plant - Acid Plant
DEVELOPMENT - EST. 65,000 TPY COPPER

General Manager.....J. H. Hunter
Ass't. General Manager.....Charles F. Cigliana
Mine Supt.....Steve Milne
Comptroller.....G. I. Valdez
Ch. Engineer.....Tom Phillips
Office Manager.....T. T. Kiser
Ch. Geologist.....J. J. Quinlan
Purchasing Agent.....Mace Trotter
Ind. Rel. Manager.....Randy Leske
Environ. Engineer.....Peter Aldred
Purch. Super.....Temple Smith
Const. Manager.....Chris Hartman
Ch. Electrican.....Merle Powell
Maint. Supt.....Joe Clark
General Mine Foreman.....Donald Beauregard
Plants Manager (Met.).....J. G. Craig

HYSLIP STONE COMPANY

Box 288, Prescott 86301 - Employees 5
Hyslip plant at Drake
Flagstone for Decorative use local and out of state markets

INSPIRATION CONSOLIDATED COPPER COMPANY

First National Bank Plaza, 100 W. Washington, Phoenix 85003 - Phone 258-4561

Vice President.....R. C. Cole

Mine and Plant

Inspiration 85577 - Phone 473-2411 - Employees 2000 approx.
In plant leach-electrowinning plant and refinery
Rod plant - Lime Plant - Acid Plant
Production: 12,814,000 T Ore, 17,020,000 T Waste, 55,688 T Cu,
105,000 lb. moly, 192,000 oz. silver, 3,900 oz. gold

V. P. & General Manager.....Douglas W. Middleton
Gen. Supt.....H. D. Harper
Ch. Exp. Geologist.....Hugh W. Olmstead
Comptroller.....John Heatherly
Ch. Resident Geologist.....John T. Eastlick
Ch. Engineer.....E. E. Burton
Dir. Ind. Rel.....Duncan McDonald
Ass't. General Supt.....J. B. Holman
Dir. of Comm. Rel.....John Gregovich
New Proj. Dir.....Jack Kuhn
Mine Supt.....T. M. Anderson
Supt. of Mine Engineer.....H. H. Mellus
Supt. of Ox-Hide Mine.....V. E. Jones

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INSPIRATION CONSOLIDATED COPPER CO. (Con't.)

Dir. of Environ. Con.....Bill Pattullo
Smelter Supt.....Rex Henderson
Utility Supt.....Carter Nelms
Property Supt.....Jim Montgomery
Rod Plant Supt.....Lloyd Scroggins
Conc. Supt.....Don Skufca
Crusher Supt.....Sherman Quayle
Supt. of Leach & Ref.....W. Huenergardt
Reduction Supt.....P. M. Musgrove
Pit Maint. Supt.....Dick Trusty
Purch. Agent.....J. M. Fentress

Joe Bush Mine

Under development

Willow Springs Mine

Under development - Leach 5,000 T Cu Anticip.

Christmas Mine Division

Winkelman 85292 - Phone 356-7803
OP Mine - Concentrator - Employees 285
Production: 1,632,000 T Ore, 9,420,000 T Waste, 9,508 T Copper

Manager.....T. A. Dodge
Mine Supt.....Guy Vallincourt
Conc. Supt.....Harry Dahlberg
Gen. Maint. Supt.....Harold Benjamin

JAQUAYS MINING CORPORATION

Victory & El Dorado Mines

Box 328, Globe 85501 - Phone 425-6381 - Employees 38
Mines 40 miles NE Globe - UG, Mill at Globe
Low Iron, Chrysotile, Filter Asbestos for filter industry. Out of Arizona markets.

President & General Manager.....D. W. Jacquays
Plant Manager & Ass't. to Pres.....Nelson Muncy
Mill Supt. & Ass't. Plt. Mgr.....Paul Wright
Mill Foreman.....Viviano Saucedo
Mining Supt.....Frank Stephenson
Bookkeeper.....Ray Scanlon
Foreman @ Victory.....Isidoro Cavazos
Foreman @ El Dorado.....Philip Lucas

KENNECOTT COPPER CORPORATION

Ray Mines Division

Hayden 85235 - Phone Office 356-7811, Mine 363-5531
Smelter Cap. 420,000 T - Employees 2200
Production: 12,322,927 T Ore, 98,908 T Copper

Smelter & Concentrator - Hayden

General Manager.....I. G. Pickering
Red. Plant Supt.....J. S. Nebecker
P.R. Director.....Jim Maize
Smelter Supt.....J. E. Stocker
Mill Supt.....W. J. Barkley
Red. Plant Ch. Engineer.....J. A. Cooper
Dir. Inds. Engineer.....C. H. Phillips
Red. Plant Maint. Supt.....R. A. Barrass
Dir. Safety & Environ. Control.....J. T. Mortimer

KENNECOTT COPPER CORPORATION (Con't.)

Ray Mines Division

OP Mine & Electrowinning Ref. - Ray

Mines Plant Supt.....C. K. Vance
Mines Plant. Ch. Engr.....H. W. Bishop
Leaching Opr. Supt.....S. F. Johnsen
Mine Plant Maint.....D. J. Justensen

LITTLE HILL MINES, INC.

Gold Hill Mine

P.O. Box 332, Oracle 85623 - Phone 896-2245 - Employees 12
OP Mine - 3 miles W. Oracle - 5600 TPM Copper-silica flux for Cu smelter

President.....Dave McGee
General Supt.....Art Coughanour

MAGMA COPPER COMPANY

San Manuel Division

Box M, San Manuel 85631 - Phone 385-2201 - Employees 4200
UG Mine & Mill N. San Manuel, Smelter at San Manuel
Production: 21,900,000 T Ore, 139,829 T Copper
Sulfuric Acid 1,000 TPD anticipated, Smelter Cap. 670,000 T/yr.
Electrolytic Ref. Cap. 200,000 T/yr.

Chairman of Board.....W. P. Goss
President.....Wayne H. Burt
Vice President.....W. L. Parks
Controller.....G. P. O'Brien
General Manager.....E. K. Staley
Manager Mining & Conc. Oper.....L. C. Acton
Mgr. Engr. & Tech. Service.....T. E. Hearon
Mill Supt.....G. W. Dopson
Mine Supt.....J. W. Goss
Acting Refinery Supt.....K. D. Parks
Smelter Supt.....R. S. Sloan
Ch. Geologist.....L. A. Thomas
Ch. Buyer.....C. D. Wavrek
Safety Director.....W. D. Wood
Office Manager.....R. A. Lee
Manager Pers. Serv.....D. C. Ridinger

Superior Division

P.O. Box 37, Superior 85273 - Phone 689-2444 - Employees 1150
Concentrator - Magma Mine UG
Production: 543,000 T Cu Ore, 22,891 T Cu

Asst. to President.....T. G. Chilton
General Manager.....C. L. Miller
General Supt.....J. W. Murray
Manager of Smelt. & Ref.....I. D. McIver
Mill Supt.....R. E. Gamble
Ch. Engineer.....F. J. Schmitz
Ch. Geologist.....R. N. Webster
Manager Purch. & Warehousing.....W. J. Mewha
Ch. Buyer.....R. L. Medlock
Dir. of Maint.....R. G. Schaal
Pers. Admin.....R. S. Skiba, Sr.
Manager Public Rel.....F. R. Harris
Office Manager.....A. Merten
Environ. Control.....R. Groves

MAGMA COPPER COMPANY (Con't.)

Magma Black Hills

P.O. Box G, Hayden 85235 - Phone 356-7322 - Employees 14
OP Limestone mine 5 miles SE San Manuel - Production 50,000 TPM

General Manager.....Gordon Wainwright
Foreman.....E. C. Munoz

McALESTER FUEL COMPANY

Zonia Operation

Route 1, Kirkland 86332 - Phone 445-1950 - Employees 25
OP Mine 4 miles SE Kirkland Junction - Copper - Leach
Production: 294,778 T Waste, 747,054 T Ore, 2,389 T Cu

General Manager.....J. J. Brunner
Mine Supt. & Ch. Engineer.....W. J. Cobey, Jr.
Ass't. Manager.....Robert Swafford
Purchasing Agent.....T. Sills

McFARLAND-HULLINGER

Winkelman Plant

P.O. Box 811, Tucson 85702 - Phone 356-7684 - Employees 7
Plant & Quarry at Winkelman - 800 TPM silica flux

General Manager.....W. D. Nelson

Hayden Quarry

Hayden 85235 - Rear of ASARCO Smelter
100 TPD limestone flux - Employees 6

Tiger Mine Tailings

2 miles SW of Mammoth - Reworking tailings - Silica flux

MOORE LIME PLANT

201 Mesa, Globe 85501 - Phone 425-6149 - Employees 13
Mine & Plant 2½ miles N. of Miami
Lime for processing plant

General Manager.....C. L. Moore
General Supt.....Luther Johnson

NATIONAL GYPSUM COMPANY

P.O. Box 20863, Phoenix 85036 - Phone 258-6106 & 258-5470 (shop)

Winkelman Gypsum Pit

Star Route, Box 89, Winkelman 85292 - Phone 356-7180
OP Mine at Feldman 10 miles south of Winkleman
400-500 TPD gypsum used in Plaster Board - Employees 7-8

Mine Supt.....Nelson Cluff

PAUL LIME PLANT INC.

Drawer T, Douglas 85607 - Phone 364-2429 - Employees 52
Quarry & Plant at Paul Spur - 570 TPD Cap. 2 Lime kilns
Lime for use in Copper processing plants

President.....Robert A. Barbero
Oper. Manager.....John Ames
Purch. Agent.....C. T. "Tom" Bishop
Sec. Tres.....Harold Hansen

PEABODY COAL COMPANY

Phoenix Office

920 Del Webb Bldg. - 3800 N. Central Avenue, Phoenix 85012 Phone 263-8193

V. P. Sales.....W. A. Williams
Sales Representative.....David E. Kirk

Black Mesa #1

P.O. Box 605, Kayenta 86033 - Phone 697-3505 & 3506
Surface Mine approx. 25 miles SW of Kayenta
Production Approx. 4,000,000 TPY Coal - Employees 157

Mine Supt.....Mike Naccarato
Ass't. Supt.....Jim Ehrenhart
Ch. Engr.....J. M. Arnold
Mech. Supt.....Clate Gatlin
Maint. Supt.....Joe Rieker
Supply Supt.....Jim Penbrook
Safety Supr.....Ed Little

Kayenta Mine

P.O. Box 606, Kayenta 86033 - Phone 697-3208 & 3209
Surface Mine - Coal - Production Approx. 7,000,000 TPY - Employees 111

Mine Supt.....Curtis W. Dement
Ass't. Supt.....Maurice Kennedy
Const. Supt.....Pat McGrew
Mech. Supt.....Clate Gatlin
Supply Supt.....Jim Penbrook
Safety Super.....Ed Tano

PHELPS DODGE CORPORATION

Western Operations Office

Box 1238, Douglas 85607 - Phone 364-8451

Sr. V. P.....John A. Lentz
Ass't. to Sr. V.P.....M. P. Scanlon
General Manager.....W. W. Little
Ass't. General Manager.....Richard T. Moolick
Ch. Mech. Engr.....J. H. Davis, Jr.
Mgr. Western Expl. Op.....P. W. Ludden Jr.
Western Purch. Agent.....H. C. Zamar
Dir. of Labor.....Richard E. Rhoades
Controller.....H. M. Visick
West. Traffic Mgr.....J. D. Jordon

Douglas Reduction Works

Drawer E, Douglas 85607 - Phone 364-2441
Smelter Cap. 875,000 T Copper - Employees 710

Supt.....W. L. Gage
Plant Engineer.....A. F. Hallett
M.M.....B. F. Kenyon
Supply Dept. Head.....C. E. Stapp
General Plt. Foreman.....R. C. Ivanecky

PHELPS DODGE CORPORATION(Con't.)

Copper Queen Branch

Bisbee 85603 - Phone 432-3621 - Employees 1500
Lavender Pit Production: 3,770,000 T Ore, 4,181,000 T Waste, 19,387 T Cu
Copper Queen UG Production: 620,387 T Ore, 22,628 T Cu

General Supt.....H. D. Clark
Acting Mine Supt.....Jack Riddle
Gen. Cont. Foreman.....James Crowley
Ch. Engr.....H. E. Metz
Ch. Geologist.....K. J. Coke
Super. Safety.....R. D. Holland
M.M.....E. A. MacDougal

Morenci Branch

Morenci 85540, Phone 865-3772 - Employees 2630
OP Mine Concentrator - Smelter, Cap. 900,000 T, Acid Plant 2,500 TPD
Production: 18,361,000 T ore, 27,063,000 T Waste, 119,535 T Cu
30,000 TPD Tailing leach plant, under construction

Manager.....J. E. O'Neill
General Supt.....J. L. Bolles
Smelter Supt.....S. W. Towle
Mine Supt.....A. Alexander
Mill Supt.....A. J. Broderick, Jr.
Ch. Engr.....J. F. Stock
Safety Engineer.....R. R. Aker
Ch. Geologist.....J. M. Langton
Mech. & Elec. Supt.....F. G. Berra
Research Supt.....G. W. Clevenger
Supply Dept. Head.....C. R. Simmons

Metcalf Mine

Near Morenci is being developed, start production in 1975
OP Mine - 60,000 TPY Copper anticipated

New Cornelia Branch

Ajo 85321 - Phone 387-7451 - Employees 1350
OP Mine - Concentrator - Smelter - Acid Plant 600 TPD
Smelter Cap. 215,000 T
Production: 10,343,000 T Ore, 19,774,000 T Waste, 53,797 T Cu

Manager.....D. H. Orr
Mine Supt.....O. F. Fenzi
Smelter Supt.....F. R. Rickard
Conc. Supt.....J. L. Shore
Ch. Engr.....J. M. Sudler
Master Mech.....F. S. Galloway
Safety Super.....T. E. Dieke
Supply Dept. Head.....J. C. Steel

Safford Branch

Box 151, Safford 85546 - Phone 428-1431
UG Mine - UNDER DEVELOPMENT - Employees 12

General Supt.....Stan Holmes
Ch. Engr.....Elton Clark
Engr.....M. I. Grigore
Geologist.....Bill Bowen

PHOENIX CEMENT CORPORATION

Clarkdale Plant

P.O. Box 428, Clarkdale 86324 - Employees 150
Quarry & Plant 2 miles W. Clarkdale - 3,200,000 BPY Cement

Plant Manager & V.P.....J. E. Conway
Quarry Supt.....J. D. Hill
Plant Chemist.....J. G. Leibert
Ass't. Plant Manager.....M. E. Wrinkle
Maint. Supt.....W. E. Hackley
Prod. Supt.....C. J. Jones
Plant Engineer.....D. H. Kishpaugh

PINAL-MAMMOTH GYPSUM

2020 S. 9th Street, Coolidge - Employees 3
1500 TPM - Agricultural Gypsum - mine 6 mi. N. of Mammoth

President.....R. D. Bechtel

PRODUCERS MINERAL CORPORATION

Peacock Mine

P.O. Box 226, N. San Juan Road, Safford 85546 - Phone 428-1772
OP Mine Dump leach - 1 TPM - Approx. 8 miles N. Safford - Employees 6

Manager.....Ira Couch
Ch. Chemist.....J. W. Boss

RANCHERS EXPLORATION & DEVELOPMENT COMPANY

Bluebird Mine -

P.O. Box 880, Miami 85539 - Phone 473-4405 - Employees 130
OP Mine - Leach - Solvent Extraction Plant - 3 miles W. of Miami
Production: 40,000 lbs. daily (estim.)

General Manager.....K. L. Power
Mine Manager.....George Van Etten
Mine Foreman.....Larry Maynard
Plant Manager.....Ron Longwell
Maint. Supt.....Joe Dalley
Purchasing Agent.....Dave Nussear

Old Reliable Mine

P.O. Box 518, Mammoth 85618 - Phone 487-2346 - Employees 12
In-situ leach - 15,000 lbs/day cement/Cu - Approx. 10 mi. E. Mammoth

Mettallurgist.....Randy Scheffel
Office Manager.....Dave Breckan
Foreman.....Gary Smith

SANTA FE CINDER PIT

Darling Cinder Pit

Santa Fe Railroad - Div. Engr. Office - Winslow 86047 - Employees 6
OP Mine - Cinders for Railroad ballass - 12 miles E. Flagstaff - 30 cars/D

Supt.....F. L. Kidd
Div. Engineer.....R. D. Garland
Foreman.....C. A. Baker

SOUTHWEST SALT COMPANY
P.O. Box 1237, Litchfield Park 85340 - Phone 935-5289 - Employees 4
Wells - Solution Mining - Salt for water softeners, cattle supplement

General Manager.....G. Grott
Vice President.....J. Savoy

SOVEREIGN IRON & STEEL, INC.
P.O. Box 1437, Coolidge 85228 - Phone 723-4131
UNDER DEVELOPMENT - Mine site approx. 18 mi. NW Oracle Junction

General Manager.....L. W. Bischoff

SUPERIOR COMPANIES
2402 S. 19th Avenue, Phoenix 85009 - Phone 253-2116 - Redimix Plant

President.....William O. Fisher
Vice President.....William J. Kessler
V. P. & Manager of Mines.....Arch Shelton

Drake Plant
P.O. Box 302, Paulden 86334 - Employees 5
Quarry 3 miles S. of Drake - Limestone used for smokestake scrubbing

Supt.....Bud South

Larson Gypsum
P.O. Box 786, Camp Verde 86332 - Employees 5
Quarry 4 miles SE of Camp Verde - Gypsum & Bentonite
Gypsum for cement additives

Supt.....Bob Matock

Winkleman Gypsum
P.O. Box 327, Winkleman 85292 - Phone 356-7002 - Employees 7
Diatomite-gypsum

Supt.....Bud South

Wenden Plant
P.O. Box 147, Wenden 85357 - Phone 859-3550 - Employees 6
OP Mine-Quarry 3½ miles S. of Plant - Plant 4 miles West of Wenden
White marble for terrazzo tile, out of state

Manager.....Ed Mattson

SUPERLITE BUILDERS SUPPLY
5201 N. 7th Street, Phoenix 85014 - Phone 263-7633

Mine Supt.....Bill Erbe

Darling Cinder Pit
Mobile Phone 774-7475 - Employees 4
OP Mine east of Flagstaff - 13 cars/day - Cinder used for building blocks

Mine Foreman.....Ted Webster

SUNRISE MINING COMPANY

Glove Mine

General Delivery, Amado 85640 - Employees 7
UG Mine - Lead, Zinc, Silver - 7 miles SE Amado

Foreman.....Irwin Wolfe

TOMBSTONE TERRITORIAL MINT

1971 MINERALS, LTD.

State of Maine Mine

P.O. Box 458, Tombstone 85638
UG & Reclaiming dump - 450 TPD anticipated - 4 miles N. of Tombstone
Silver is end product

Metallurgist.....John White

Mining - 1971 Minerals Ltd.

General Manager.....Charles Escapule

Milling & Ref. - Tombstone Territorial Mint

Manager.....Lewis Escapule

GORDON WAINWRIGHT CONTRACTOR

Chillito Mine

P.O. Box G, Hayden 85292 - Phone 356-7322 - Employees 3
OP Mine Silica-copper flux for copper smelters - Approx. 4 mi. N. Hayden

General Manager.....G. Wainwright
Foreman.....James Goodridge

O. BRICE WILLIS

Harmony No. 1

P.O. Box 1325, Clifton 85533 - Phone 864-3782 - Employees 5
OP Mine - Silica 600 TPM - Chase Creek - N. of Morenci

President (Owner).....O. Brice Willis
General Supt.....M. Clifford Willis

WESTERN STATES STONE COMPANY

P.O. Box 316, Ashfork 86220 - Phone 637-2542 - Employees 6
Decorative Building stone - Marketed local and out of state
Plant at Ashfork - numerous quarries

Supt.....G. B. Madison

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REVISED LIST OF EXPLORATION COMPANIES IN ARIZONA

ALCOA
Western Exploration Office
4131 North 24th Street (264-9474)
Phoenix, Arizona 85016

Willard Colgrove - Manager
John Dyer - Geologist
Roy H. Carwile - Geologist
Charles W. Haynes - Geologist
Marvin W. Hollingsworth - Geol.

AMAX EXPLORATION INC.
Southwestern Exploration
2510 N. Campbell (795-4731)
Tucson, Arizona 85719

Charles P. Miller - Regional Mgr.
Marvin R. Stauffer - Sr. Geol.
J. T. Green - Adm. Ass't.
Wim Lodder - Sr. Geol.
F. Leon Lopez - Geologist
H. J. Delaney - Geologist
John Hursh - Geologist
W. M. Danley - Geologist
Ken Lovstrom - Geochemist
Frank P. Fritz - Geophysicist

AMERICAN SELCO INC.
1127 N. 6th Avenue (624-3284)
Tucson, Arizona 85705

John Prochnau, Reg. Expl. Geol.
Les Bradshaw - Geologist

AMERICAN SMELTING & REFINING COMPANY
1130 N. 7th Street (792-3010)
P.O. Box 5747
Tucson, Arizona 85703

Harold Courtwright - Ch. Geol.

Southwest Expl. Division
William L. Kurtz - Supervisor
James D. Sell - Geologist
Robert B. Crist - Property Mgr.
Fredrick T. Graybeal - Geologist

ANACONDA COMPANY
Natural Resources Group
General Mining Division - Geol. Dept.
8000 Kolb Road & I-10
P.O. Box 27007
Tucson, Arizona 85726

G. A. Barber - V.P. & Ch. Geol.
L. B. Gustafson - Ch. Geol. Tech. & Research
R. C. Baker - Ch. Geol. Metals Expl.

BEAR CREEK MINING COMPANY
1714 W. Grant Road (624-5547)
Tucson, Arizona 85705

G. D. Van Voorhis - Expl. Dist. Mgr.
Donald C. Bulmer - Sr. Geologist
Gordon Lister - Sr. Geologist
M. P. Martineau - Geologist
Larry F. Barrett - Geologist
James I. Lyons - Geologist
Steven C. Potter - Geologist
F. B. Greenhalgh - Landman

BEAVER EXPLORATION COMPANY
4740 Camino Escuela (299-3188)
Tucson, Arizona 85718

Philip Eckman - Expl. Mgr.

CITIES SERVICE MINERALS CORP.
550 W. Ina Road (297-2027)
(after Sept. 23, 1974 at)
2002 N. Forbes Blvd. Suite 102
Tucson, Arizona 85705 (792-3236)

W. W. Simmons - Reg. Geologist
Robert C. Moore - Dist. Geologist
Charles C. Riecken - Dist. Geologist
James P. Vroman - Geologist
George S. Lindenburg - Geologist
Allen Hennessy - Geologist
Jack L. Young - Geophysicist

COMINCO AMERICAN
3533 E. Speedway (325-5581)
Tucson, Arizona 85716

Hugh D. Moore - Dist. Expl. Geol.

CONTINENTAL COPPER INC.
Box 662 (896-9500)
Oracle, Arizona 85623

C. H. Reynolds - V. P.
John Roscoe - General Mgr.

CONTINENTAL OIL CO. METALLICS DIV.
1706 West Grant Road (623-3627)
Tucson, Arizona 85705

B. F. Kern - Geological Supervisor
J. M. Kirkwood - Geologist
R. C. Moores - Geologist
R. E. Anderson - Geologist
Ray Threlkeld - Geologist
G. L. Pine - Geologist
J. N. Lukanuski - Geologist
Wes Pokluda - Sr. Landman

CYPRUS BAGDAD COPPER COMPANY
Box 245 (633-2241)
Bagdad, Arizona 86321

Purnendu K. Medhi - Ch. Geologist

CYPRUS MINES CORPORATION
Arizona Operations Office
2343 E. Broadway - Suite 207
Box 4368 (624-3245)
Tucson, Arizona 85717

Wm. Rundle - Vice President
Robert Clayton - Proj. Engr.

DUVAL CORPORATION - Exploration Dept.
5357 E. Pima (793-9336)
Tucson, Arizona 85712

J. I. Sharpe - Gen. Mgr. Expl.
R. C. James - Regional Geol.
J. D. Sefton - Geologist
M. P. Krier - Geologist Engr.
W. C. Peterson - Geol Engr.
R. A. Metz - Dist. Geologist
E. S. Montgomery - Sr. Geologist
T. L. Mahall - Ch. Draftsman

EL PASO NATURAL GAS COMPANY
Mining Division
P.O. Box 1492
El Paso, Texas 79999

John R. Reynolds - Mgr. of Expl.

Leslie Mead, Box 1313,
Kingman, Arizona 86401

ESSEX INTERNATIONAL INC.
1704 West Grant (624-7421)
Tucson, Arizona 85705

Paul Eimon - Mgr. of Exploration
G. Heinrichs - Ass't. Mgr. of Expl.
Ken Jones - Chief Geologist
Dennis Temple - Sr. Expl. Geologist
Bob Helming (Safford) - Geologist
Don Bellum - Mgr. New Mine Develop.

EXXON COMPANY, U.S.A.
1758 West Grant Road (622-8801)
Tucson, Arizona 85717

Lawrence D. Hayes - Expl. Superv.
Dwight G. Moore - Sr. Mining Geol.
Geoffrey Parsons III - Sr. Geol.
Roland E. Graves - Lab Mgr.
Roger G. Rowe - Sr. Geol.
Mical Slater - Sr. Mineral Geol.
Darrel Dean - Geologist
John McKnight - Sr. Mineral Geol.
J. D. Dolence - Prof. Geol.
Michael Fellows - Geologist
Frank Ward - Sr. Geol.

FREEPORT EXPLORATION COMPANY
2302 East Speedway (881-6070)
Suite 110, Speedway Prof. Bldg.
Tucson, Arizona 85719

K. Cornelius, Dist. Expl. Mgr.
R. E. Lehner - Sr. Expl. Geologist
Frank J. Nelson - Geologist

HANNA (COASTAL) MINING COMPANY
3539 E. Speedway (327-2366)
Tucson, Arizona 85716

Steve Van Nort - Resident Mgr.
Mike Harris - Geologist

GREAT AMERICAN MINE COMPANY
(See Page 5)

HECLA MINING COMPANY
P.O. Box 493 (836-2141)
Casa Grande, Arizona 85222

Herbert E. Harper - V.P. Expl.
James Quinlan - Ch. Geol.

HEINRICHS GEOEXPLORATION CO.
800-810 W. Grant Road (623-0578)
Tucson, Arizona 85703

W. E. Heinrichs Jr. - President
Chris Ludwig - Chief Geophysicist
Russell Jolliffe - Geophysical Sup'v.
M. Ludden - Electronics Engr.
Mary Turner - Office Manager

HOMESTAKE MINING COMPANY
Box 17120 (885-7272)
7700 E. Tanque Verde Road
Tucson, Arizona 85731

John Cameron - Reg. Geol. Mgr. SW Dist.
Thomas F. Kuhl - Geologist

INSPIRATION CONSOLIDATED COPPER CO.
Inspiration, Arizona 85537 (473-2411)

Hugh W. Olmstead - Ch. Expl. Geol.

KERR McGEE CORPORATION
Box 26547 (624-8595)
1639 E. 18th Street
Tucson, Arizona 85726

David Snyder - Reg. Expl. Mgr.
R. M. Corn - Reg. Expl. Geol.
Donald J. McConnell - Dist. Geol.
Kenneth G. Hatfield - Sr. Geol.
Dave A. Wolfe - Geol.
Pat Sokolowski - Secretary

KEYSTONE MINERALS INC.
6318 E. Hayne Street (298-3551)
Tucson, Arizona 85710

E. Nelson - Manager
Dirk Den-Baars - Geologist

KNOX-ARIZONA CORPORATION
526 E. Glenn (624-0355)
Box 5663
Tucson, Arizona 85703

William A. Knox - President
Anthony Lane - Sec. Treas. & Geol.

McFARLAND & HULLINGER
P.O. Box 811 (325-2310)
Tucson, Arizona 85702

W. D. Nelson - Sup't.

MINERALS EXPLORATION COMPANY
1708 W. Grant Road (624-1572)
Tucson, Arizona 85705

Paul H. Pickard - Reg. Expl. Mgr.
David Osborne - Sr. Geol.
Richard Sherrer - Expl. Geol.
W. G. Zinn - Ch. Geophysicist
D. B. Berson - Office Mgr.
Robert B. Ellis - Geophysicist

MOUNTAIN ROYAL MINING & EXPLORATION
Box 93 (359-2649)
Duncan, Arizona 85534

Douglas E. Hanson - Sup't.
Leslie H. Billingsley - Mine Mgr.

MOUNTAIN STATES STATES MINERAL DEVELOPMENT CORPORATION
Box 17960 (792-2800)
Tucson, Arizona 85731

Fremont F. Clarke - Pres. & Dir.
R. M. McGeorge - Exec. V.P. & Dir.
Jack C. Pierce - V.P. Mineral Develp.
Edward S. Frohling - Tres. & Dir.
John B.M. Frohling - Sec. & Dir.

NEW JERSEY ZINC COMPANY
2030 E. Broadway (624-4971)
Tucson, Arizona 85719

J. E. Teet - Reg. Geol.
Peter Dhoms - Geologist

NEWMONT EXPLORATION COMPANY
200 W. Desert Sky Road
RFD #6 (297-1142)
Tucson, Arizona 85704

Byron S. Hardie - Expl. Mgr.
Hugh Steele - Sr. Geol. & Ass't. Mgr.
J. O. Guthrie - Expl. Geol.
M. H. White - Engr.
H. David MacLean - Geophysicist
Robert W. Sayers - Geol.

NORANDEX, INC.
2601 North 1st Avenue (623-2505)
Tucson, Arizona 85705

William D. Payne - Dist. Geol.
H. Rene' Moulinet - Field Engr.
Jo S. Drechsler - Geol.
John Dunbler - Geol.

NUCLEAR DYNAMICS, INC.
2871 Sky Harbor Blvd. (267-0581)
Phoenix, Arizona 85036

Herb Miller - Chairman
Kelsey L. Boltz - Exec. V.P.
Norman E. Eastmoore Jr. - V.P.
Francis X. Cannaday - Mgr. of Base and Precious Metals

OCCIDENTAL MINERALS CORP.
6839 E. Camina Principal (886-5394)
Tucson, Arizona 85715

Noel Horlocker - Sr. Geol.
Michael Owens (Nevada) - Geol.
Frank Molina - Field Ass't.

PARNASSE COMPANY INC.
6710 E. Camelback - Suite 102
Scottsdale, Arizona 85051

Patrick D. Darcy - Expl. Mgr.

PERRY, KNOX, KAUFMAN, INC.
2343 E. Broadway
Box 12754 (622-0582)
Tucson, Arizona 85732

A. J. Perry - President
Robert Blakestad - Geol. Engr.

PEABODY COAL COMPANY
Box 335 (697-3545)
Kayenta, Arizona 86033

John Gingrich - Ass't. Area Engr.
Leonard Sawtelle - Office Engr.
Doug Meacham - Field Party Chief
William Mills - Field Party Chief

PHELPS DODGE COPR.
Western Expl. Office
Drawer 1217 (364-8414)
Douglas, Arizona 85607

Ray Ludden - Mgr. of West. Expl.
A. M. Hauck III - Chief Geophy.

PLACER AMEX INC.
5220 E. Pima (326-4411)
Tucson, Arizona 85712

C. B. Gillette - Dist. Geol.
Jim Stewart - Geol.

PLACER MEXICANA
5315 E. Broadway
Room 208-A (793-2466)
Tucson, Arizona 85711

Dr. Robert M. Slipp - Expl. Mgr.

QUINTANA MINERALS CORP.
1892 W. Grant Road (622-4801)
Tucson, Arizona 85705

W. E. Saegert - President
John W. Horton - Sr. Staff Geol.
Peter G. Dunn - Sr. Staff Geol.
Bruce E. Kilpatrick - Sr. Staff Geol.
Julio C. Barranco - Drilling Sup'v.

RANCHERS EXPLORATION & DEVELOPMENT
P.O. Box 880 (473-4405)
Miami, Arizona 85539

Ken Powers - Gen. Manager

RIDGE MINING COMPANY
Exploration Dept. (790-3101)
6245 E. Broadway, Suite 580
Tucson, Arizona 85711

Nabil Saweeres - Geol.
David Brown - Geologist
Alan Edwards - Geologist

RIO AMEX CERROMIN
2002 N. Forbes Blvd.
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Tucson, Arizona 85705

T. W. Mitcham - Expl. Mgr.

ROSARIO EXPLORATION COMPANY
5923 E. Pima Street (298-6551)
Tucson, Arizona 85712

Joe Wise - Dist. Geol.
John Schulz - Geol.

ST. JOE MINERALS CORPORATION
2002 N. Forbes Blvd.
Suite 108 (622-4766)
Tucson, Arizona 85705
Wayne K. Wallace - Mgr. U.S. Expl.
Paul A. Head - Chief Geophysicist
Merwin Bernstein - Mgr. Foreign Expl.
Bert Renzetti - Sr. Geol.
Ray Hammitt - Geologist
Rick Russell - Geologist
Charles T. Longshore - Field Sup'v.

SIERRA MINERAL MANAGEMENT
4741 East Sunrise Drive (299-9736)
Tucson, Arizona 85718

Richard Hewlett - President
John Beeder - Chief Geol.
Susan Costa - Exec. Sec.

J. R. SIMPLOT MINERAL EXPLORATIONS
1019 West Prince Road
Suite 205 (888-3422)
Tucson, Arizona 85705

Norm Lehman - Dist. Geol.
William C. Jone - Geologist

SUPERIOR OIL COMPANY
Minerals Division P.O. Box 12487
6520 E. 22nd Street (296-5433)
Tucson, Arizona 85732

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