

STATE OF ARIZONA
DEPARTMENT
OF
MINES AND MINERAL RESOURCES



CYPRUS COPPERSTONE
GOLD MINE

'MINING IS BASIC'
1987-1988
ANNUAL REPORT



STATE OF ARIZONA

DEPARTMENT OF MINES AND MINERAL RESOURCES

Mineral Building • State Fairgrounds • Phoenix, Arizona 85007
(602) 255-3791

October 1988

The Honorable Rose Mofford, Governor
The State of Arizona
1700 W. Washington
Phoenix, Arizona 85007

Dear Governor Mofford:

The Annual Report of the Arizona Department of Mines and Mineral Resources is submitted to you in compliance with ARS Section 27-106.

The statutory obligation of the Department is one of service. The Department is fully funded by the Legislature in the belief that the wise use of the land and mineral resources of the state can be assisted by the establishment of a scientific, investigative and information agency whose purpose it is to conduct research and provide information for use by the Legislature, governmental agencies, industry, and the public.

As noted in the text of the report, by performing this service the Department causes and assists in the creation of economic activity by various phases of the mining industry in the state of Arizona. During 1987 the mining industry directly and indirectly generated in excess of \$7.5 billion of commerce. The non-fuel mining industry directly generated in excess of \$500 million in revenue to state and local governments of Arizona. The coal and uranium production had a value of \$265 million. Direct and indirect economic impact from this was approximately \$855 million including approximately \$65 million in revenue to state and local government. In summary, the mining industry in Arizona is a \$7.5 billion industry that added nearly \$600 million to the treasuries of state and local government.

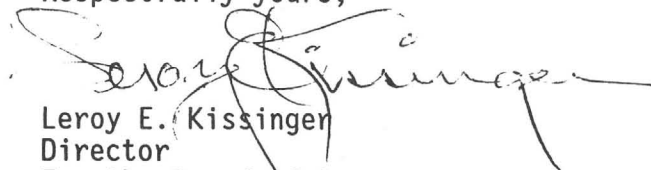
The Department of Mines and Mineral Resources has a direct effect on the minerals exploration activity in the state. The report notes that this activity generates about \$18.5 million worth of business. Revenue to state and local government cannot accurately be determined. However, it is estimated that taxes on this activity would be about \$1.7 million.

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With the ongoing work on four resource evaluation projects by our staff, it is certain new mining ventures will be generated. As these projects come on stream, the economy of the state will benefit accordingly.

The most urgent need of the Department at present is relocation of the Department offices and the Mineral Museum. It is hoped an early decision can be made to commit to acquisition and remodeling of the El Zariba Shrine building on 15th Avenue for this purpose. Our continued presence at the State Fairgrounds is increasingly difficult as time passes.

Respectfully yours,



Leroy E. Kissinger
Director
For the Board of Governors

individual basis. The wholesale designation of large acreages as wilderness without consideration of other resources and uses should not be allowed.

the federal agencies.

Disregarding interests other than the mineral potential the majority of the lands proposed fall within the Arizona mineral belt that traverses the transition and basin and range geologic provinces across the entire state of Arizona.

It is impossible to determine the mineral potential on these lands without extensive exploration and evaluation. A few areas could likely be written off as having little or no potential. However, because of the uncertainties, the remainder of these lands should be left open for multiple use management until they can be properly evaluated.

In just the past year a new and important mine has been put into production in this region. It is the Copperstone gold mine described elsewhere in this report. This mine is in a geologic environment that has excellent potential for several, if not many, similar discoveries during the next 10 years. The potential for critical minerals such as cobalt, platinum and tungsten is also high in these same areas.

The availability of lands with potential for mineral deposits is under severe threat by the wilderness proposals. With proper regulation and management of these lands, all interests can be served. The permitting process can require necessary environmental protection of areas that are ultimately developed for their mineral resources. If in fact there are areas that have unique, natural and pristine values as defined in the 1964 Wilderness Act, they should be set aside and given thorough evaluation on an

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Phone: 542-3791

Leroy E. Kissinger	Director
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Alice Rosenfeld	Part Time Museum Tour Guide
Fred Rothermel	Part Time Museum Tour Guide
Alice Smith	Part Time Museum Tour Guide

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Harrison Matson	Mining Engineer
Vacant	Mineral Field Geologist
Frances J. Derrick	Secretary

The Future of Mining

Predicting the future is a risky endeavor particularly when it comes to mining. This is especially true in these times when the decisions on whether to explore and develop new mines is so heavily influenced by factors not related to mining or marketing of mine products. The boom and bust cycles of the past were largely a result of availability and markets.

Mining in the United States and in Arizona has become a very complex business influenced as much by environmental controls and land use planning as by prices and markets. While the mining industry has solved most of the environmental problems, the availability of new land for the exploration of minerals is questionable.

With the combined lands encompassed by the National Forests, the National Parks, BLM managed public lands, Wildlife Reserves, Indian Reservations, and land withdrawn for military use, the Federal government controls 69% of all the lands in the state of Arizona. Lands already withdrawn from potential mineral exploration for all intents and purposes include the military and Indian reservations, the National Parks, the Wildlife Reserves, and 49 areas totaling 2,031,877 acres already in the National Wilderness Preservation System. It is certain that otherwise exploitable, valuable mineral deposits are located within these withdrawn areas.

It is now proposed by the U.S. BLM, the U.S. Forest Service, and the U.S. Fish and Wildlife Service that 2.5 million new acres be added to the Wilderness Preservation System. The Arizona Wilderness Coalition has proposed that the area be increased to 4.1 million acres or 60% more than proposed by

During the calendar year of 1987, Energy Fuels Nuclear produced 2.1 million pounds of uranium with a value of approximately \$35 million. Prices for uranium fluctuate as they do for other metals. Until there is a clear policy established by the Federal government, the future for the domestic uranium industry is uncertain.

The most significant totally new occurrence in mining was the start up of Cyprus Minerals Company's gold mine north of Quartzsite. Annual production from this mine will be 60,000 ounces starting with 1988. This is 1 1/2 times the total for the state in 1987. Gold production for Arizona in 1988 will be approximately 100,000 ounces with a market value of \$40 million. Previous gold production has been primarily a by-product from the copper industry.

Sand and gravel for construction and industrial minerals had a total market value in excess of \$315 million during 1987.

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Non-fuel minerals produced in Arizona during the year 1987 had a value of \$2.2 billions. The chart below shows the quantities of each commodity produced and relative value.

<u>Minerals</u>	<u>Quantity</u>	<u>Value in \$1,000</u>
Clay (Short Tons)	212,000	1,482
Copper (Metric Tons)	1,016,000	1,016,000
Gem Stones	NA	2,836
Gold (Troy Ounces)	40,000	18,000
Gypsum (Short Tons)	262,000	1,832
Lime (Short Tons)	549,000	22,439
Moly (Pounds)	5,939,000	51,082
Pumice (Short Tons)	4,000	26
Sand & Gravel (Const.) (Short Tons)	38,200,000	140,000
Silver (Troy Ounces)	3,217,000	23,161
Stone (Crushed Short Tons)	5,200,000	22,400
Miscellaneous ¹	N/A	124,239
TOTAL		2,200,224

The statistics above do not include the coal mined on the Navajo-Hopi reservations. Because of the Federal policy of assigning fuel minerals such as uranium and coal to the Department of Energy instead of the Bureau of Mines, production data is more difficult to obtain. However, coal production in Arizona is approximately 11,500,000 tons annually. All of this is produced from the two mining complexes on the Reservation. Depending on markets, the value of the coal mined is approximately \$230 million. It is difficult to measure the actual impact on the Arizona economy, but suppliers and users are all non-Indian entities. Most of the coal is used in the two power plants of Page, Arizona and Laughlin, Nevada.

Likewise, the production of uranium is not included in the table above.

1. Combined value of cement, perlite, pyrites, salt, industrial sand and gravel, & dimension stone.

Mining Today

During and since World War II there have been great strides in industrial development in Arizona. As a result, the mining industry is a smaller percentage of the total economy in spite of substantial growth in finite terms. Regardless of the relatively lower position in economic impact to the state, the mining industry and related businesses still contributed \$6.762 billion to the Arizona economy in the calendar year 1987. Included in that is approximately \$500 million in revenue paid to state and local governments.¹

The industrial classification system used by the Arizona Department of Economic Security places some smelter and refinery workers in manufacturing employment so that an accurate accounting for employment by the mining industry is not possible. However, the approximately 11,000 people employed directly by the mines and mills grows to about 53,000 when factored for the ripple effect of service industries related to the mining industry. The copper industry alone was directly and indirectly responsible for more than 3% of all personal income received by Arizona residents in 1987.

1. Statistical information from Western Economic Analysis Center and ADMMR Reports.

THE DEPARTMENT OF MINES AND MINERAL RESOURCES

Statutory Assignment

The Arizona Department of Mines and Mineral Resources is authorized by ARS Section 27-101 with the objectives to promote the development of the mineral resources of this state through technical and educational processes including field investigations, public seminars, forums, speaking engagements, public news media and other functions necessary to achieve its objectives.

Implementation of Assignment

Mineral Museum - The Department operates the State of Arizona Mineral Museum. The museum is the official repository for the identification, cataloging and displaying of mineral specimens of ores, gemstones, and lapidary materials found in the state. The museum also operates a small store to sell mineral specimens.

Education - The Department conducts seminars and training sessions to assist the public in the proper staking of claims and locating and extracting of minerals. Through an extensive series of publications over the years, the Department has accumulated useful guides to mineral law, location of mineral occurrences in the state and technology to mine and extract minerals.

The museum staff conducts programs on a regular basis to educate teachers and students of Arizona's schools from kindergarten through college.

Information and Assistance - The Department maintains the most comprehensive records and resource library of mining activity, spanning the period of the earliest settlers to the present day, that is available anywhere. With these files and library the Department is able to assist prospectors, mining companies, rockhounds and the general public in the efforts to locate and develop mineral resources. The engineering staff is able to provide technical assistance in general mining and processing of minerals for those who need it.

Assistance to Government Agencies - The Department staff spends a great deal of time investigating, sampling, acquiring assays of samples and providing a wide range of information to assist both state and federal agencies in their attempts to prosecute the many fraudulent "mining" promoters who are running amok in Arizona. Recent national publicity has been given to the many schemes to defraud investors by selling them "ore" containing gold. Our department staff has been in the forefront in acquiring evidence to build a legal case against the perpetrators. Both the Securities Division of the Corporation Commission and the Federal Trade Commission have been involved.

We have provided technical assistance to the State Land Department, the State Department of Environmental Quality, the Department of Revenue and the Attorney General's Office.

The Department has worked with the U.S. Bureau of Mines on many projects over the years. Most recently, the Department has compiled a complete data base listing of all the known mineral occurrences in the state for the Bureau's Mineral Industry Location System. We have all of that data filed

mining activity has been an important part of the development of the Territory and State ever since. The first Territorial Governor believed minerals were the most important factor in being able to establish a civilized society in Arizona.

From the end of the Civil War to the beginning of World War II, as many as several hundred mines operated and produced copper, gold, silver and other metals. The value of these mines to the new state in terms of jobs, commerce, revenue and money into the economy are almost incalculable. Without this effort, it is difficult to envision what Arizona would have become.

Following World War II, the copper mining industry was renewed to higher than ever levels by the onset of several large open pit mining operations that now span the whole state from the southeast to the northwest corners. With several cycles of boom and bust, improved technology, and new efficiencies developed by company-wide restructuring, the copper industry had come full circle by 1987, and is now competitive with the rest of the world. Production and revenue have not yet reached the peak years of 1979-82, but after the low point in 1986 it is on a positive climb.

MINING IN ARIZONA

Historical Perspective

Mining is basic. The slogan is commonly used by a variety of mining interests to promote the industry and to educate the public about how mining and its products affect everyone. There is nothing that is used by the human race that does not incorporate some product of the mining industry. Agriculture, automobiles, building construction, paint, computers, television, radio, paper products, aircraft, communications and everything else used by man has somewhere in its make-up at least one substance that was taken from the earth. This fact has been true since the beginning of man.

In Arizona, mining has been an important factor from the time of the early miners among the various Indian tribes. The ancient people used clays for pottery, pigments for decoration of their bodies and shelters, chert and flint for their tools and weapons, and turquoise, silver and gold for jewelry. True enough, mining was crude and was done on a small scale but it is still a clear example of how even the most primitive cultures were dependent on mining.

The primary reason for the exploration of this part of the New World by the Spaniards was to find the treasures of gold and silver the natives had accumulated. As the missionaries established the settlements of Southern Arizona, mining became a part of the developing civilization.

Mining in Arizona lay dormant from the period of the Mexican Revolution for independence from Spain (1810-12) until after the U.S.- Mexican wars and the Gadsden Purchase. With a slowdown during the Civil War years excluded,

both on computer storage and hard copy.

The Department regularly performs services for, or works cooperatively with, both the U.S. Bureau of Land Management and the U.S. Forest Service.

Response to Inquiries - The Department staff responds to thousands of in person and telephone inquiries each year. The inquiries are about every conceivable subject related to rocks, minerals and lands on which they occur. A sample of these subjects are listed for example only:

1. Identification of rocks or minerals
2. Regulatory interpretation
3. How to stake a claim
4. How to do placer mining
5. How to find a placer deposit
6. Should I invest in a project
(Usually after the fact)
7. Response to legitimate mining company geologists, engineers, and other prospectors reviewing our library and files for information that might lead them to locating and developing a viable mineral deposit
8. How do I file assessment work

Project Work - The engineering/geological staff of the Department does major projects to evaluate mineral resource potential over the state. These efforts result in printed publications that are available to the public, usually at a price sufficient to pay the cost.

There are four major projects that are currently assigned to staff. It is planned that these will be completed and a resulting publication of the reports in 12 to 18 months. The greatest difficulty is in isolating the staff from the large number of public inquiries long enough to do this work. The projects are listed with no particular priority as:

1. Sand and gravel resources
2. Gold and other precious metals
3. Oxide copper

4. Survey and development of markets for industrial minerals that occur in exploitable quantities in Arizona

The major administrative hurdle that needs to be overcome is the relocation of the Department offices and mineral museum. It is hoped that the old Shrine Building on the Government Mall can be committed and remodeled for that purpose.

In summary, minerals exploration activity in the state generates \$18.4 million of economic activity each year in the state. Approximately \$1.3 million in state and local revenue would be generated from this activity. Much of this activity is likely reported by other agencies. For example, the Office of Tourism would report the food, lodging and transportation part of this number. Gasoline sales would be a factor in the other activity. It is all mining industry related economic activity none-the-less, and is directly related to the efforts of the Department of Mines and Mineral Resources.

Industry Activity

During the fiscal year 1987/88 there were 25 Arizona based companies and 40 non-Arizona based companies conducting exploration activities in the state. About 400 people were involved in this effort. Exploration activity includes drilling, geophysical surveys, claim staking, land surveying, surface and underground sampling, and assaying, among other things.

As mentioned elsewhere in this report, most of the people involved in the minerals exploration business in Arizona gather basic information for their efforts from files and staff of the Department of Mines and Mineral Resources.

It is impossible to determine an accurate account of the economic impact this activity has on the economy of Arizona. However, some reliable assumptions can be made on the magnitude of expense involved.

Four hundred people in the field for 200 days and spending \$70 per day on food, lodging and transportation generates \$5.6 million.

There are 20,000 mining claimants that routinely work their claims on a regular schedule each year and would spend \$200 doing so. This would generate \$4.0 million.

There are 148,000 active mining claims in the state of Arizona that require annual assessment work of \$100 per claim. Some of the claims will have no work done at all, and some may have false affidavits of labor filed; however, it is reasonable to expect that 60% of these claims will have a minimum of \$100 work done. This would generate \$8.8 million.

SUMMARY OF ACTIVITY

Statistical Report

The Arizona Department of Mines and Mineral Resources has a staff of eleven full-time people and one half-time person. In addition to the director, there are five mineral engineers/geologists, a museum curator, four administrative people and a half-time custodian. Four part-time helpers are paid from the museum store funds for work in the minerals museum and to conduct classes.

During the fiscal year 1987/88, the staff responded to approximately 11,000 telephone inquiries and 4,000 visitors seeking information about rocks, minerals, mining projects, and a host of mineral occurrences in their search for new mineral discoveries. These calls and visits are sometimes taken care of in a few minutes. More often, each inquiry requires the staff person to research the mine files or library for more detailed information about the area of interest. This can take from a few minutes to a few days. Many of the visitors spend hours of their own time researching files for leads and information about mineral occurrences in the state. There were approximately 6,500 file and/or library searches conducted for this purpose during the year.

As a part of this association with mining company people and prospectors, the staff acquires additional information that is added to our files. There were 278 new mine files created during this period.

There were 10 publications created and published by the Department during this year. They were:

- Directory of Earth Science Clubs
- Directory of Exploration Offices
- Directory of Active Mines
- Directory of Arizona Mining Consultants
- Arizona Industrial Minerals
- 48th Annual Report
- The Primary Copper Industry of Arizona in 1986
- Arizona Rockhound Guide
- Mineral Show List
- Maps and Books for Arizona Gold and Gold Prospecting (revised)

The following list of federal and state agencies were assisted by the Department staff one or more times during the year. Work varied from a brief evaluation of a specific area to extended support to regulatory and law enforcement agencies investigating fraudulent mining schemes:

- U.S. Bureau of Mines
- U.S. Forest Service
- U.S. Geological Survey
- U.S. Securities and Exchange Commission
- Federal Trade Commission
- Federal Bureau of Investigation
- State Land Department
- Bureau of Geology and Mineral Technology
- Department of Environmental Quality
- State Mine Inspector
- University of Arizona
- Department of Water Resources
- Corporation Commission - Securities Division

Financial Statement

State Appropriation

Appropriated Funds	\$452,600
Actual Expenditures	435,322
Reverted	17,278
(Personal Services	\$11,261)
(Employee Related	5,628)
(Operating Funds	389)

The retirement and replacement of the Department Director and the replacement of one engineer released personnel funds for reversions.

Mines and Mineral Resource Fund

Income	
Balance forward	\$3,842
Donation Box Receipts	1,091
Donations (other)	150
Museum Store Sales	<u>26,287</u>
Total	\$31,370

Expenses	
Personal Services	\$10,557
Employee Related Expenses	908
Resale Merchandise	12,889
Store Expenses	280
Museum Expenses	2,417
Department Expenses	102
Museum Mineral Collection	<u>1,235</u>
Total	\$28,388

Balance 7/1/88	\$2,982
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Printing Revolving Fund

Balance Forward	\$4,100
Publication Sales	13,330
Publication Expenses	<u>13,100</u>
Balance 7/1/88	\$4,330