

1975-76

ANNUAL REPORT

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ARIZONA GEOLOGICAL SURVEY
OPEN-FILE REPORT

This report is preliminary and has not been edited or reviewed for conformity with Arizona Geological Survey standards

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Completed phase I of a field study of geologic hazards in the Cañada del Oro-Santa Cruz Valley area for the United States Geological Survey.

Conducted field study and sampling project on Deer Creek and Pinedale coal deposits for the United States Geological Survey.

Conducted research into the possible use of City of Tucson municipal sewage water effluent in copper mining and milling operations under the sponsorship of the Office of Water Resources Research. (Interim results published as Circular 17.)

Conducted research into the engineering of hydrometallurgical processes for copper extraction as an alternative to smelting processes under the sponsorship of the United States Bureau of Mines.

Assisted the United States Bureau of Mines in the collection of mineral production statistics in the State of Arizona.

Served as Arizona Collaborator in Seismology with the National Oceanic and Atmospheric Administration and the United States Geological Survey.

Completed field study and laboratory research on uranium occurrences of the Mogollon Rim and Slope region of Central Arizona under a grant from the United States Geological Survey. (Report available on open-file.)

MAJOR STRENGTHS

The Arizona Bureau of Mines is the earth science and mineral resource experimental and informational agency of the State. Its major strength lies in its affiliation with the University of Arizona and the College of Mines. This affiliation affords the Bureau the freedom from the regulatory, promotional, and policy-making responsibilities of most state agencies and the opportunity to be objective in its scientific and practical interpretation of natural phenomena. Further, the Bureau, being a public service agency, requires accessibility by the public. Its location on the University campus, in the heart of the major mineral-producing area of the State, is a decided asset to its mining and metallurgical services.

The staff of the Arizona Bureau of Mines is extremely well-suited for the service role of the organization. Their patience and diligence in this respect has been outstanding. The expertise of the staff covers a variety of specialties and a broad background of knowledge concerning the State and its resources. These strengths complement the informational responsibilities of the Bureau and enable it to fulfill the major duty of a state geological survey--"to provide answers to local problems in applied geology based on the intimate knowledge of the staff."¹

¹ Linn Hoover, former Executive Director, American Geological Institute.

MAJOR LIMITATIONS

The major limitation of the Arizona Bureau of Mines is its small size compared to similar agencies in other states. The Bureau serves as the geological survey of the State, and as such its operations and services should be comparable to those of other states. The State of Arizona is one of the larger states (approximately 115,000 square miles), has the largest non-fuel mineral industry, and is one of the fastest-growing states in the nation. In spite of this, the Arizona Bureau of Mines has one of the smallest budgets of any of the survey organizations in the United States and, consequently, has one of the smallest professional staffs.

Primary to these problems is the fact that the Arizona Bureau of Mines is not readily identifiable to the public as a "geological survey" or is an individual identifiable to the public as the "state geologist". These are functions which exist in nearly every other state in the nation and are identified as such; the Bureau has been to outside view purely a "mines bureau", reflecting its 60-year-old charter, when in fact its "geological activities" significantly outnumber its "mining and metallurgical" activities. The budgeting treatment of the Arizona Bureau of Mines as a research unit of the University is a detriment to its operations in times of budget restrictions to education. The Arizona Bureau of Mines is a statutory unit of State government and, therefore, is a research and information arm of State government. While funding is sought and obtained from non-state sources, it is entirely appropriate for the State to be the major contributor to the Bureau's budget.

The Bureau suffers from the lack of a full-time individual who is responsible for the programs and well-being of the organization. Arizona is only one of two states to have the responsibility for the organization to be shared by that of a college dean...a practice which has been common only to a few western states. The output of the Bureau in terms of information derived and disseminated about the natural environment of the State suffers as a consequence of its small size and its part-time director.

Space has continued to be a major problem for the Bureau during 1975-76--both with regard to amount and location. The Bureau has only one laboratory equipped to carry out research and ore testing. At times as many as five simultaneous projects are conducted in this laboratory. Such diverse and crowded use of one laboratory leads to confusion, low efficiency, mistakes, and safety hazards. The Bureau needs additional, well-equipped laboratory space if it is to function as a viable research-service organization.

The mineral technology staff is involved in both service and investigative research. The nature of the research requires a large amount of technical support for a small amount of research. Since there is no technical support staff for mineral technology, the professional staff members must be their own technicians. This is not only a wasteful use of manpower, but it limits the amount of research that can be accomplished and eliminates other functions in which the Bureau should be involved. The mineral technology branch needs a metallurgical technician and an analytic technician to free the professional staff for more productive work.

FUTURE PLANS

Continuing its efforts to grow apace with the needs of our changing society, the Geological Survey Branch will continue its studies of geologic hazards and how they affect the continuing urban development of the State, and also try to develop recommendations on how to alleviate some of the more common detrimental effects.

Negotiations are underway between the Bureau and the U.S. Geological Survey whereby the Bureau will take over the servicing and monitoring of the Tucson station of the World-Wide Seismic Net through a telemetered circuit. If these negotiations come to fruition, it is our intention to use the station, with modifications, to establish an Arizona seismic net in cooperation with the Department of Geosciences.

Some success has been achieved in expanding our publication program through cooperation with the Geology Department at Arizona State University and steps are being taken to extend our cooperative efforts to other schools and State Agencies.

In the Mineral Technology Branch of the Bureau, research to determine the feasibility of using municipal waste water in copper milling and processing operations will be continued for at least one year, and a new project will be initiated to study the recovery of copper from leach solution by cementation.

The Mineral Technology Branch conducts a wide variety of metallurgical amenability tests each year. Although many of the ore tests are very similar, no standard procedures have been developed for ore tests. Thus, standard procedures for the most common ore tests will be developed by the mineral technology staff.

A very important function of the Bureau is to maintain liaison with the mining industry. This area has been neglected in the past few years, but improved liaison with the mining industry will be pursued through visits to mining properties, attendance at appropriate meetings, and contacts with individuals.

As reported last year, we have proposed an up-to-date format for the organization of the Bureau to the State Legislature for consideration. Basically, the following points are covered by the proposed new charter:

1. Recognition of the Bureau as the geological survey organization of the State by specifically charging it with this responsibility;
2. Establishment of the post of "State Geologist" as an official position within State government;
3. Designating the State Geologist as the administrative officer of the geological survey branch of the Bureau;
4. Establishment of an Advisory Board consisting of the President of the University, the principal officers of the natural resource-oriented state agencies, a representative of the minerals industry of the State, and a member-at-large representing the general public.

Although the legislation was not acted upon during the 1976 session, it will be introduced again in the coming year.

PRO FORMA

1975-76 EXPENDITURE BY CATEGORY

	<u>AMOUNT*</u>	<u>PERCENTAGE</u>
<u>TECHNICAL AND ENVIRONMENTAL SERVICES</u>		
Mineral and Rock Identification	\$ 15,808	5.22
Metallurgical Process Amenability	17,655	5.83
Consultation to Citizens and Other State Agencies	<u>54,134</u>	<u>16.88</u>
Subtotal	\$ 84,597	27.93
<u>MINERAL RESOURCE AND GEOLOGICAL INFORMATION</u>		
Mineral and Rock Collections	\$ 400	0.13
Oil and Water Well Repository	2,485	0.82
Geologic Research	62,917	20.77
Metallurgical Research	14,832	4.90
Fieldnotes	16,215	5.35
Teaching, College of Mines	14,960	.94
Attendance and Participation, Prof. Soc. Activities	8,325	2.75
Reprinting out-of-print maps and bulletins	7,288	2.40
Santa Cruz County Mine Index Project (Bull. 191)	4,985	1.64
Yuma County Mine Index Project (Bull. in preparation)	15,978	5.27
Geology in Land-Use Planning (Bull. in preparation)	10,894	3.60
Geology of the White Mtns. (Bull. in preparation)	1,775	0.59
Geology of Southern Tucson Mtns. (Bull. in preparation)	9,424	3.11
Use of Treated Waste Water in Mineral Flotation (Circ.17)	<u>2,295</u>	<u>0.76</u>
Subtotal	\$172,773	57.03
<u>ADMINISTRATION</u>		
Operations Direction	\$ 27,119	8.95
Clerical	<u>18,436</u>	<u>6.09</u>
Subtotal	\$ 45,555	15.04
TOTAL	\$302,925	100.00
<u>SOURCES OF INCOME</u>		
Operating Budget	\$251,743	
Service Charges	6,605	
Transferred		
--Publications fund	\$ 3,423	
--Grants	<u>41,154</u>	
	<u>44,577</u>	
TOTAL	\$302,925	

*Exclusive of fringe benefits to employees and university overhead

PUBLICATIONS FUND (REVOLVING)**

Carry-over from 1974-1975 \$ 6,279
Collections (7/1/75--6/30/76) 14,715

Total Income \$20,994

Expenditures
--Publications Cost
--Refunds

\$3,423
34

Total Expenditure \$ 3,457

Carry-over to 1976-1977

\$17,537

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