

Arizona's Metallic Mineral Districts: A Wealth of Information

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This summary is provided to acquaint members of the exploration community, from prospectors to professionals, with recently compiled information and some current projects at the Arizona Bureau of Geology and Mineral Technology.

With the release of Bulletin 194, *Metallic Mineral Districts and Production in Arizona* (Keith and others, 1983a), the Bureau expands its role in investigating Arizona's mineral resources. In Bulletin 194, known metallic mineral occurrences are divided into discrete metallogenic groups of similar age and style of mineralization. This effort was prompted by the need to define *mineral districts* according to geologic criteria rather than the traditional geographic association of mines used in the standard *mining district* classification.

Bulletin 194 serves as the baseline for Bureau research in economic geology. It provides production statistics for most of the mineral districts outlined on its map. Production data include metals recovered from milled ore, minor, directly smelted ore, and reworked tailings. Because many of the metallic mineral occurrences are poorly understood, mineral-district boundaries could change as knowledge of the deposits and geologic settings improves. Bulletin 194 may be inspected at or purchased from the Bureau (\$6.50, plus \$2.00 for shipping and handling).

Two companion products augment the information in Bulletin 194. U.S. Geological Survey (USGS) Open-File Report 84-0086 (Keith and others, 1983b) provides terse descriptions of geologic settings and an extensive list of references for Arizona's mineral districts. The open-file report may be inspected in the Bureau library or purchased from Open-File Services Section, Western Distribution Branch, U.S. Geological Survey, Box 25425, Federal Center, Denver, CO 80225. The bibliographic information is undergoing further review and will probably be published by the Bureau on a county-by-county basis. Another supplement to Bulletin 194, now being compiled, lists ore grades from individual mineral districts. The Bureau will release this information as an open-file report.

In addition to mineral-district information, the Bureau has geologic information on mines in Arizona that have produced more than 100 tons of ore. Bureau staff, under contract to the USGS, compiled the Arizona portion of the Mineral Resource Data System (MRDS). This section includes nearly 3,300 records with information on the location, geology, and production of metallic mineral commodities. Individual mines are grouped according to the mineral-district classification of Keith and others (1983a,b). The records, of variable quality, contain summaries of information available in published literature, private reports and files, and field examinations. Peterson (1984) gives a more complete description of the MRDS data for Arizona. A copy of the Arizona MRDS data may be inspected in the Bureau library or obtained from the USGS. A subset of MRDS pertaining to molybdenum occurrences in Arizona has been placed on open file by the U.S. Geological Survey and is also available for inspection at the Bureau (Wilt and others, 1984).

All mines and prospects in Arizona, regardless of known production, are recorded in the U.S. Bureau of Mines (USBM) Minerals Industry Location Subsystem (MILS). The Arizona portion of MILS was compiled by subcontractors to the Arizona Department of Mines and Mineral Resources (ADMMR), under contract to the USBM. MILS, a subset of MAS (Minerals Availability System), lists deposit name and synonyms, precise location, type of operation, and current status for each mine. Although it does not furnish geologic information, MILS can be useful in locating obscure mining properties. MILS data for Arizona may be inspected in the Bureau library or obtained from the USBM or ADMMR.

The Bureau recently released map compilations that are of use to the mineral-exploration community. A geologic-map index (Scarborough and Coney, 1982) provides location information for more than 550 references concerning geologic mapping in Arizona. The index may be inspected at or purchased from the Bureau (\$5.00, plus \$1.50 for shipping and handling). An update through June 1984 (Scarborough and McGarvin, 1984) is also available (\$2.00, plus \$1.50 for shipping and handling). Newly published Map 19 (Keith, 1984), a map of outcrops of Laramide (Cretaceous-Tertiary) rocks in Arizona and adjacent regions, is now available from the Bureau (\$3.00, plus \$1.50 for shipping and handling). This map delineates the known occurrences of Laramide-age rocks in Arizona, and should help to define prospective areas of igneous rocks within the State.

Bureau files contain a wealth of information about the geology of Arizona's metallic mineral occurrences. Bureau staff are working to make these data useful to mineral-exploration personnel. One current project is a report, entitled "Geology of Mid-Tertiary Mineral Districts in Arizona." The report summarizes the geology, age, style of mineralization, current production value, and ore grade for each Arizona mineral district of presumed mid-Tertiary age.

REFERENCES

- Keith, S. B., 1984, Map of outcrops of Laramide (Cretaceous-Tertiary) rocks in Arizona and adjacent regions: Arizona Bureau of Geology and Mineral Technology Map 19, scale 1:1,000,000.
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- Keith, S. B., Schnabel, Lorraine, DeWitt, Ed, Gest, D. E., and Wilt, Jan, 1983, Map, description, and bibliography of the mineralized areas of the Basin and Range Province of Arizona: U.S. Geological Survey Open-File Report 84-0086, 129 p., scale 1:500,000.
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- Scarborough, R. B., and Coney, M. L., 1982, Index of published geologic maps of Arizona, 1903 to 1982: Arizona Bureau of Geology and Mineral Technology Map 17, scale 1:1,000,000, 6 plates.
- Scarborough, R. B., and McGarvin, T. G., 1984, Update of published geologic maps of Arizona: Arizona Bureau of Geology and Mineral Technology Open-File Report 84-5, scale 1:1,000,000.
- Wilt, J. C., Keith, S. B., Peterson, J. A., Huber, D. F., and Theodore, T. G., 1984, Preliminary report of molybdenum occurrences in Arizona: U.S. Geological Survey Open-File Report 84-9, 1440 p.

PUBLICATIONS

The Encyclopedia of Applied Geology, C. W. Finkl, Jr., ed., 1984, 644 p. Provides practical coverage of engineering geology, hydrology, rock-structure monitoring, and soil mechanics. Available from Van Nostrand Reinhold Company, Inc., 135 W. 50th St., New York, NY 10020 (\$75.00).

Man-Induced Land Subsidence, T. L. Holzer, ed., 1984, 231 p. Includes nine papers covering three general areas: fluid withdrawal from porous media, drainage of organic soil, and collapse into manmade and natural cavities. Available from Geological Society of America, Publication Sales, P.O. Box 9140, Boulder, CO 80301 (\$28.00).

Mineral Resources Appraisal—Mineral Endowment, Resources, and Potential Supply: Concepts, Methods, and Cases; D. P. Harris, 1984, 445 p. Provides quantitative methods for estimating mineral and energy resources, using economic, geologic, and statistical models. Available from Oxford University Press, 200 Madison Ave., New York, NY 10016 (\$59.00).