



Vol. 27, No. 1
Spring 1997

Arizona Geology

Published Quarterly by the Arizona Geological Survey

**ARIZONA
GEOLOGICAL SURVEY**
INFORMATION TO
ARIZONANS SINCE 1889

MISSION

To provide unbiased information to the public to enhance understanding of geologic processes, materials, and resources and support prudent management and use of Arizona's land, water, mineral, and energy resources.

FUNCTIONS

- Provide information about Arizona geology
- Map and describe bedrock and surficial geology
- Map and characterize mineral and energy resources
- Investigate geologic hazards and limitations
- Prepare and publish geologic maps and reports
- Maintain databases and files
- Maintain geology library
- Maintain rock cuttings and core repository
- Provide administrative and staff support for Oil and Gas Conservation Commission

A.R.S. §27-152

Earth Science Information Center

Larry D. Fellows, Director
Arizona Geological Survey

The Tucson Earth Science Information Center (ESIC) was relocated to the Arizona Geological Survey (AZGS) office at 416 West Congress Street in December. The ESIC, a cooperative activity between the AZGS and the U.S. Geological Survey (USGS), was established in 1992 to better serve the public by providing information from both agencies at a single location. Heather C. Thrall, with backup from several other AZGS employees (below), oversees the operation of the ESIC.

We encourage you to use the ESIC. The telephone number and website address are listed on page 2.

ESIC Products and Services:

- Topographic maps, including complete coverage of Arizona at 1:24,000 scale
- Geologic maps and reports published by the USGS, Arizona Geological Survey, Arizona Geological Society, and other organizations
- Geology library, which is focused on Arizona and adjacent areas
- Bibliographic and other databases
- Oil and gas drilling and production information
- Well cuttings and core repository
- Consultation with geologists on matters pertaining to Arizona geology
- Referrals to other governmental agencies
- Free brochures, pamphlets, and lists of available publications



Heather C. Thrall
ESIC Supervisor



Rose Ellen McDonnell
Administrative Officer



Mary E. Redmon
Publication Sales Manager



Mary E. Pasborg
Publication Assistant

Oil and Gas

GOVERNOR FIFE SYMINGTON

ARIZONA GEOLOGICAL SURVEY

Director and State Geologist
Larry D. Fellows, Ph.D.

Publications

Rose Ellen McDonnell
Peter F. Corrao
Mary E. Redmon
Mary E. Pasborg

**Earth Science
Information Center**
Heather C. Thrall

Geology Library
Thomas G. McGarvin

**Arizona Geologic
Information System**
Richard A. Trapp

**Center for Land-Subsidence
& Earth-Fissure Information**
Robin Frisch-Gleason

Mapping and Investigations
Jon E. Spencer, Ph.D.
Philip A. Pearthree, Ph.D.
Stephen M. Richard, Ph.D.
Charles A. Ferguson, Ph.D.
Wyatt G. Gilbert, Ph.D.
Raymond C. Harris
Jeanne E. Klawon
Kraig M. Korroch
Robert S. Leighty
Steven J. Skotnicki
Jennifer P. Thieme
Michelle L. Wood

Oil and Gas Program
Steven L. Rauzi

LOCATION

Arizona Geological Survey
416 W. Congress, Suite 100
Tucson, AZ 85701
(520) 770-3500

<http://www.state.az.us/gis/index.htm>

Arizona Geology

is published quarterly by the Arizona Geological Survey (AZGS) to provide information about geologic materials and processes and their impacts on the development and use of Arizona's land, water, mineral and energy resources. We encourage your comments and suggestions.

Design and layout:

Peter F. Corrao

Copyright © 1997
by the Arizona Geological Survey
Printed on recycled paper

Arizona Geology
Spring 1997 • Page 2

Drilling. The PetroSun 15-1 NMAL was drilled north of Concho in central Apache County in mid-1996. A pocket of methane was reported at about 1,030 feet. Total depth of the well, which is now shut in, was 3,648 feet.

The two wells drilled by Ridgeway Arizona Oil Company near St. Johns in 1994 and 1995 were completed for future production of carbon dioxide, but remain shut in. Ridgeway has permits to drill five more wells.

The Premco western well in Mohave County and the Arzon well in Cochise County are shut in. No shows of oil or gas were reported.

Leasing. State Trust Land under lease for oil and gas drilling increased to 246,000 acres in December 1996 from 105,000 acres the year before. State Trust Land is leased for a primary 5-year term with an annual rental of \$1.00 per acre. The State Land Department administers leasing, which is noncompetitive.

Leases on Federal land decreased to 80,000 acres from 130,000 acres for the same period. Leasing of Federal land is competitive and is for a 10-year primary term. The annual rental is \$1.50 per acre for the first 5 years and \$2.00 per acre for the second 5 years. The U.S. Bureau of Land

Management, within the Department of the Interior, administers Federal leases. The last Arizona lease sale was held in June 1995.

Commission. The next Arizona Oil and Gas Conservation Commission (AOGCC) meeting will be in Phoenix March 14, 1997. All regular meetings are open to the public. Steven L. Rauzi, Oil and Gas Program Administrator, will provide information about meetings.

J. Dennis Wells, the new State Land Commissioner, is, by statute, an ex officio member of the AOGCC. Wells, who succeeded M. J. Hassell in January 1997, was previously the Deputy Commissioner.

1997 Meetings

April 9. HAZWASTE '97, Phoenix Civic Plaza. The HAZWaste Society annual trade show and conference provides a forum for those in the environmental industry to share new technology, products, and services. A golf tournament is scheduled for April 10. Contact: Phil Immordino, The Champion Group, (602) 371-1695, or the website, www.endat.com/haz97.htm.

April 10-12. GeoDaze Symposium, Department of Geosciences, University of Arizona, Tucson. GeoDaze is a forum for students to present research results and interact with interested attendees. Undergraduate and graduate students throughout Arizona, New Mexico, Nevada,

and Sonora, Mexico, are encouraged to participate. Contact: Department of Geosciences, (520) 621-6024; e-mail, geodaze@geo.arizona.edu; or website, <http://www.geo.arizona.edu/geodaze/97/>.

May 13-15. Basin and Range Province Seismic Hazards Summit, Reno, NV. Meeting will stress evaluation of approaches, techniques, and policies for seismic hazard characterization in extensional regions. The meeting is sponsored by the Western States Seismic Policy Council (WSSPC), Federal Emergency Management Agency, and U.S. Geological Survey. Details for paper selection can be found on the website at

<http://vishnu.glg.edu/wsspc/brpshs.html> or by calling the WSSPC office at (415) 974-6435.

September 17-20. Arizona Hydrological Society, Tenth Annual Symposium, Carefree Inn, Carefree. This meeting includes technical talks, field trips, and exhibits. Contact: David L. Kirchner, Basin and Range Hydrogeologists, (602) 840-3333.

October 20-23. Geological Society of America, Annual Meeting, Salt Lake City, UT. Contact: GSA, 800-472-1988; E-mail, meetings@geosociety.org; or website, <http://www.geosociety.org>.

New Publications

The Arizona Geological Survey (AZGS) released the following reports and maps since November 1996:

Distribution of uranium in rocks and radon levels in water in the San Carlos-Safford-Duncan Nonpoint-Source Management Zone:

R.C. Harris, 1996, Open-File Report 96-28 (Pub. number OFR 96-28), 10 p., 3 plates, scales 1:250,000 and 1:500,000. \$10.00

Geochemical data were compiled from the AZGS and the U.S. Atomic Energy Commission, Department of Energy, Bureau of Mines, and Geological Survey to examine relationships between uranium concentrations in surface rocks and radon levels in ground water.

Geologic map of the Picacho mine area, southeastern California:

S. M. Richard and J. E. Spencer, 1996, Open-File Report 96-30 (Pub. number OFR 96-30), 1 sheet, scale 1:10,000. \$2.00

The Picacho mine, north of Yuma on the California side of the Colorado River, has had a long history of gold production. This map was prepared to determine the geologic setting of gold mineralization at the mine and, thereby, provide a possible guide to undiscovered gold deposits in adjacent Arizona. The map covers the area around the mine, but not the mine itself. The area has been broken by numerous Tertiary normal faults and contains abundant breccia of uncertain origin.

Distribution of evaporites and implications for water quality in the San Carlos-Safford-Duncan Nonpoint-Source Management Zone:

R. C. Harris, 1997, Open-File Report 97-03 (Pub. number OFR 97-03), 56 p., 2 plates, scale 1:500,000. \$14.00

Evaporite minerals such as anhydrite, gypsum, and halite are common and widespread in the Safford and Duncan subsurface basins. One body of anhydrite and halite, south of Safford, is at least 2,270 feet thick. Hot springs and wells in the area commonly produce salty water. Natural sources of soluble minerals, such as halite, are probably a major factor in the quality of water in the Gila River.

How to Order Them

You may purchase publications at the AZGS office or by mail. Address mail orders to AZGS Publications, 416 W. Congress St., Suite 100, Tucson, AZ 85701. Orders are shipped by UPS, which requires a street address for delivery. All mail orders must be prepaid by a check or money order payable in U.S. dollars to the Arizona Geological Survey or by Master Card or VISA. Do not send cash. Add 7% sales tax to the publication cost for orders purchased or mailed in Arizona. Order by publication number and add these shipping and handling charges to your total order:

Shipping & Handling CHARGES

In the United States:

Less than \$1.01, add \$1.00
1.01- 10.00, add 3.00
10.01- 20.00, add 4.50
20.01- 30.00, add 5.75
30.01- 40.00, add 6.50
40.01- 50.00, add 8.00
50.01- 100.00, add 10.25
Over 100.00, add 12%

Other countries, request price quotation.

Geologic Mapping Award

The Arizona Geological Survey (AZGS) was awarded \$151,036 from the Statemap component of the National Geologic Mapping Program to do detailed bedrock geologic mapping in the Theodore Roosevelt Quadrangle and surficial geologic mapping in the Casa Grande Quadrangle (1:100,000 scale) in Fiscal Year 1998. Funds are also included in the contract for preparation of digital geologic maps of the Mesa 1° x 2° Quadrangle. The

funding received will be matched with an equal amount from the AZGS General Revenue appropriation, making the total cost of the project more than \$300,000. The U.S. Geological Survey administers the Statemap program in cooperation with the Association of American State Geologists, which is composed of the directors of the State geological surveys.

AZGS Research Geologists J. E. Spencer, P. A. Pearthree, and

S. M. Richard will participate in the project, together with geologists C. A. Ferguson, W. G. Gilbert, R. S. Leighty, and S. J. Skotnicki, who are paid from contract funds. J. Thieme, also paid from the contract, will digitize geologic maps.

Forty-three State geological surveys submitted mapping proposals totalling \$5.4 million. About \$3.7 million was available to be awarded.

Shipping and handling charges include insurance. For rolled maps, add \$1.00 for a mailing tube.

If you purchase Open-File Reports, Contributed Maps, or Contributed Reports at the AZGS office, allow up to two days for photocopying.

Arizona Geology

Page 3 • Spring 1997

Arizona Legislature-Bills Introduced

Bills listed below, of interest to those in the environmental and engineering fields, were introduced prior to January 31. Hundreds of other bills have also been introduced. The last day for introduction of bills was February 3 in the State Senate and February 10 in the House of Representatives.

Information about the bills listed below, or those introduced after January 31, may be obtained from the information desk at the Senate in Phoenix at (602)

542-3559; the House, also in Phoenix, at (602) 542-4221; or from the Tucson Legislative office at (520) 628-6593 or 628-6596. Copies of bills are available from the mailroom in Phoenix at (602) 542-4379 or from the Tucson office.

House Bill (HB) 2039 prescribes standards for storing and monitoring radioactive wastes and repositories.

HB 2139 amends provisions for performance and

payment by professionals covered by the Board of Technical Registration.

HB 2234 amends standards for soil remediation.

HB 2287 restricts location of solid-waste facilities relative to residentially zoned parcels of land and operating schools.

HB 2306 amends aquifer water-quality standards.

HB 2399 prescribes confidentiality to personal

information maintained by professional boards.

HB 2426 creates a new Commission on the Arizona Environment.

Senate Bill (SB) 1021 funds the Department of Water Resources for a hydrologic study of the Sierra Vista sub-basin of the upper San Pedro River ground-water basin.

SB 1193 amends granting of environmental education awards.

Earthquake Information

ACES. The Arizona Council on Earthquake Safety (ACES) met in January to plan 1997 activities. ACES was established by Governor Symington in 1993 (Executive Order 93-3) to provide a consistent policy framework and a means for continuing coordination of governmental programs

and activities with those in the private sector.

Brochure. "Arizona Earthquakes - Are we at risk?" has been revised and reprinted in English and Spanish. It describes Arizona's earthquake hazard and potential effects of major California earthquakes on Arizona; includes a list of earthquake

safety tips; and has a list of persons to contact for information. Free copies of the brochure are available.

Seismic Sleuths. A one-day for-credit course about earthquakes is offered to teachers by the Division of Emergency Management. The course is designed to meet national science standards.

Information. For information about the ACES, brochure, Seismic Sleuths course, Earthquake Program, and other related activities of the Arizona Division of Emergency Management, contact Al Franco, Earthquake Program Manager, at (602) 392-7510.



Arizona Geological Survey

416 West Congress, Suite 100
Tucson, AZ 85701
(520) 770-3500

Address Correction Requested

NON PROFIT ORG.
U.S. POSTAGE
PAID
TUCSON, ARIZONA
PERMIT NO. 3088