



AGS NEWSLETTER

ARIZONA GEOLOGICAL SOCIETY, INC. AUGUST 2006

DINNER MEETING SPEAKER AUGUST 1, 2006

R. DOUGLAS BARTLETT, CLEAR CREEK ASSOCIATES

Environmental Hydrogeology of Porphyry Copper Mines in Arizona

ABSTRACT: Groundwater is a critical component of mining and, in particular, porphyry copper mining in the desert Southwest U.S. Since the advent of stricter U.S. environmental regulations, mines have expended considerable resources to understand groundwater flow systems better in and around mining operations. Various federal and state environmental permits require the installation of monitor wells around mining facilities to detect groundwater quality impacts from mining operations. These studies have resulted in an unprecedented increase in groundwater resource data around mines. Additionally, as surface water supplies have become fully appropriated, miners have looked to groundwater to fill their water needs. The combination of environmental and water supply requirements has made the study of hydrogeology at mining properties crucial for future copper mining in Arizona. This presentation will provide a review of issues encountered by hydrogeologists at Arizona mining properties. Hydrogeology issues most often encountered include: hydrogeologic studies for environmental permits, dewatering studies for open pit mines, groundwater resource investigations for water supply studies, and contaminant transport studies to develop remediation strategies for contaminated aquifers.

Hydrogeologic studies for permitting purposes can involve development of extensive networks of monitor wells as well as the evaluation of historical exploration or development drilling programs conducted by the mine owner. The historical data generated by exploration geologists can be particularly useful in guiding hydrogeologic investigations. (Continued on page 2)

Dinner Meeting Schedule:

Inn Suites Hotel: 475 N. Granada Ave. in Tucson

Cash Bar @ 6 pm Dinner @ 7 pm Talk @ 8 pm

Cost: With reservation: Members \$20, Guest \$22, Students \$7 Without reservation \$2 additional. Please call (520) 663-5295 by 5 pm before **July 31st**. Indicate if a low-salt or vegetarian meal is required. Please cancel if you are unable to attend.

CALENDAR OF EVENTS:

- Aug. 16 AGS Symposium Committee Meeting
- August 24 AGS Executive Committee Meeting
- Sept. 5 AGS Dinner Meeting, Patrick Leahy, USGS
- October 3, AGS Dinner Meeting, Lewis Teal, Newmont Yanacocha Mine

Member News:

Welcome to new members **Lawrence Segerstrom, Scott Parks, Jeff Cornoyer, Karl Sandhill-Weiss**, Augusta Resources, and **Mary Pawlowski**, Augusta Resources.

We got good news that member **Jim LeAnderson** made it out of Beirut 2 weeks before fighting broke out so he and wife Betty are fine.

ABSTRACT Continued from page 1 Information such as where groundwater is first observed, zones where lost circulation may have been encountered, high water temperatures, and the amount of water produced during drilling can all be indicators of groundwater conditions useful for a hydrogeologist. Monitor wells or groundwater exploration wells can then be sited using insight gained from the development drilling program, reducing the risk and overall cost of the hydrogeologic study.

The data generated from these studies is often used to develop both a conceptual hydrogeologic model and a computer model. The computer model is used to evaluate the potential impact of mining on both groundwater and surface water resources. In some cases, regulatory agencies have required the projection of groundwater impacts for thousands of years. This is a challenging and difficult undertaking with many opportunities to introduce small errors that, when extrapolated over such long periods of time, increase with the length of the simulation.

Environmental permits require a high degree of hydrogeologic certainty to be successful. To make the study defensible, aquifer testing must be conducted using industry-standard methods and equipment. Every aquifer test is unique and requires individualized analysis taking into account various local factors. As mining properties tend to be mainly situated in bedrock terrains, aquifer test analyses and interpretation of groundwater flow patterns are particularly challenging to interpret. A review of bedrock issues encountered at mining properties will be discussed.

The water issues faced by miners today will only increase in the future. Careful planning and the collection of appropriate groundwater data today will assure a long and profitable future for mining in Arizona. *Doug Bartlett is a principal of Clear Creek Associates and can be contacted at (480) 659-7131 or dbartlett@clearcreekassociates.com. Clear Creek is a Silver Sponsor for the 2007 symposium.*

Proposed Slate of 2007 Officers & Councilors

Don't miss the **AGS Annual Meeting** (September dinner meeting) where the proposed slate of Officers and Councilors will be presented for your vote. As a corporation, AGS must also get approval from you for the actions taken by the Executive Committee in the past year. As you can see, we still have some vacancies. Are you interested in serving as a volunteer as either the Secretary, Vice Secretary (membership records manager), or Councilor? Contact President Powell at 520-670-5505.

President	Ann D. Pattison, Independent
VP Programs	Robert J. Kamilli, U.S. Geological Survey
VP Field Trips	Rich Brown, Clear Creek Associates
VP Marketing	Michael L. Alter, Clear Creek Associates
Treasurer	Kris Hefton, Vane Minerals
Vice Treasurer	Coleen Brown, American Red Cross
Secretary	To be confirmed
Vice Secretary	To be confirmed
Past President	Robert Powell, U.S. Geological Survey
Councilor 1 (07-09)	To be confirmed
Councilor 1 (07-09)	To be confirmed
Councilor 2 (06-08)	To be confirmed
Councilor 2 (06-08)	Jon E. Spencer, Arizona Geological Survey
Councilor 3 (05-07)	James F. Hays, Retired
Councilor 3 (05-07)	David J. Maher, University of Arizona

AGS SUMMER BOOK SALE

Now's the time to pick up your copy of an AGS map, field trip guidebook, or map at a discount. Copies will be available at the dinner meeting or by mail (with postage/handling added). Please contact the AGS Secretary at (520) 663-5295 or corihoag@msn.com if you would like to order a copy by mail.

AGS Digest #7	\$1	Tectonic Digest #10 w. maps	\$5
AGS Digest #9	\$1	AGS Digest #13	\$5
Rel. of Tectonics to Ore Deposits in S. Cordillera,			\$10
Gold & Silver Deposits of Basin & Range, Digest 15			\$17
Frontiers in Geol. & Ore Deposits of Arizona and the Southwest			\$20
Geologic Evolution of Arizona, Digest 17,			\$45
Mesozoic Rocks of S. Arizona & Adjacent Areas			\$15
Prot. Geology & Ore Deposits of Arizona, Digest 19			\$20
Porphyry Copper Deposits of Amer. Cordillera			\$55
AGS Digest 21, Desert Heat - Volcanic Fire by D. Kring			\$14



2006 MEMBERSHIP DIRECTORY SPONSORSHIP

AGS is now accepting advertisements for the 2006 AGS Membership Directory. High quality photos of scenic Arizona, interesting outcrops, and our members are also needed. If you can volunteer your time to help with the pre-production and post-production work, let us know. The rates for advertising are listed below:

SIZE	RATE	APPROX. DIMENSIONS
Business Card	\$25	Standard Business Card
½ Page	\$100	4.7" w x 4" h
Full Page	\$200	4.7" w x 7.9" h

What is needed: AGS can work with a variety of formats for your company ads: camera-ready, a business card, or an electronic file (.bmp, .doc, .jpg, tif, .pdf, etc.). The artwork will fit in the size limitations listed above. Feel free to submit a digital or hard copy sized to 8.5" x 11" and we will size it to fit. AGS retains digital copies of all ads published in 2005, so can place those ads again without a hard copy or digital file.

Date needed: July 30 deadline - directory will be published in early August. Advertisers will receive a copy of the directory.

Send to: Please email digital copies directly to VP Marketing, Michael Alter at malter@clearcreekassociates.com or mail a hard copy to: AGS, P.O. Box 40952, Tucson, AZ 85717. If you have questions, call Mike at (520) 622-3222. Remit payment by check with the copy of the advertisement. AGS will send you an invoice (if needed) and a receipt. Thanks for your support.



ARIZONA
GEOLOGICAL SOCIETY

P.O. Box 40952
Tucson, AZ 85717-0952

Phone: (520) 663-5295
www.arizona Geological Soc.org

NON-PROFIT ORG.
U.S. POSTAGE PAID
TUCSON, ARIZONA
PERMIT NO. 1346

SEE WWW.AGSSYMPOSIUM.ORG FOR
INFO ABOUT THE AGS 2007
SYMPOSIUM

For info on ordering AGS
publications, visit
www.arizona Geological Soc.org.
AGS books & maps are sold at the
dinner meetings and by the
Arizona Geological Survey.

Current membership stands at 351. If you have a "05 Renew" on your address, please renew your 2006 calendar year dues. As always, please keep us up-to-date as you move, change jobs, or email addresses.

2006 AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

Please mail check with membership form to: Arizona Geological Society, P.O. Box 40952, Tucson, AZ 85717

Dues (check box) 1 year: \$15; 2 years: \$30; 3 years: \$40; full-time student (membership is free)

Name: _____ Position: _____

Company: _____

Mailing Address: _____

Street City State Zip Code

Work Phone: _____ Home Phone: _____

Fax Number: _____ Cellular Phone: _____

E-Mail: _____ I wish to receive newsletter by E-mail

If registered geologist/engineer, indicate registration number and State _____

Enclosed is a _____ tax-deductible contribution to the J. Harold Courtright Scholarship Fund.

Enclosed is a _____ tax-deductible contribution for the 2007 AGS Symposium.