



AGS NEWSLETTER

ARIZONA GEOLOGICAL SOCIETY, INC. JULY 2008

DINNER MEETING SPEAKER JULY 1, 2008

M. STEPHEN ENDERS, NEWMONT MINING CORPORATION

Bridging the Gaps in Exploration & Mining - Opportunities for Research and Development across the Life Cycle of an Ore Deposit

ABSTRACT: Mine-related research offers a rich field of study for geoscientists. Unfortunately, many geoscience-related research projects are supposed to be useful for exploration, but most fall far short of achieving this objective. The new competitive space for collaborative research lies in the mining value chain particularly in the mining, processing and environmental areas, but not necessarily at the exclusion of exploration.

This conclusion is directly related to the big challenges currently facing the mining industry. First, there is a huge demand for metals and other natural resources at a time when new deposits are more difficult and certainly more expensive to discover. Second, all elements of the mining value chain have been hit by escalating operating and capital costs. Third, there is a dire need for talent and labor to support a vibrant workforce in the mining industry. Fourth, economic development associated with new and existing mining operations is seriously challenged by the new paradigms of social and environmental responsibility. So, it will be more important than ever to get more out of our existing mines than to make new discoveries going forward.

So, where do geoscientists fit into this new paradigm of technological challenges in the resource sector? Clearly, there are important opportunities for geoscientists to pursue that will help the front end of the mining life cycle in the exploration sector. But, the greatest value to society and the most interesting technical challenges lie in the solution of some of the key technological challenges in efficiently mining and extracting deeper, lower grade and more refractory ores from our existing deposits, and applying those lessons to the development of the next generation of discoveries.

The key issues that geoscientists can apply their knowledge and skill to include: better predictive models of where deposits form, what are their key exploration characteristics, and what are their key geometallurgical characteristics. From an exploration perspective, four-dimensional geological frameworks at a crustal-scale are highly valuable long-term planning tools. (continued on page 3).

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 \$24, Guest \$26, Students \$10 Without reservation \$3 additional. Please call **(520) 663-5295** by 5 pm before **June 30th**. Indicate if a low-salt or vegetarian meal is required. Please cancel if you are unable to attend.

CALENDAR OF EVENTS:

- August 5 AGS Dinner Meeting, Dick Heermance, USGS, Terrace formation & climate change in southern California
- Sept. 2 AGS Dinner Meeting, Alyson Thibodeau, UA, Earliest silver extraction by European colonists in the New World
- October 7, AGS Dinner Meeting, Mark Barton, UA, Iron-oxide copper gold deposits: A Cordilleran perspective



Other Geoscience News:

The next **Geologist Examination** for the **Arizona Board of Technical Registration** is scheduled for October 3. Visit www.btr.state.az.us and www.asbog.org for more information.

THE PREZ SAYS...ARIZONA IS A HOT PLACE FOR MINERALS

JULY COLUMN BY LEE ALLISON, AGS PRESIDENT

Everyone knows what's going on with oil prices. You can't open the paper or turn on the television without a wrenching story about how someone's life is affected by \$4 gasoline or plans for a simple political fix that will solve it all with no consequences. And those of us in Arizona are pretty up to date on the price of copper, since two-thirds of the nation's supply comes from our mines. The public and news media follow oil, gold, and to a much lesser extent, silver. Gold and uranium prices are down from recent highs, but industry is taking the long view and continuing to explore and invest in them.

But everywhere you look, some of the less flashy mineral commodity prices are going ballistic:

- Potash is up ten-fold in the past five years with most of that in the past year or two, and may nearly double again this year. Since most of it is used for fertilizer, that's having an impact on food costs. It's being referred to as the "hottest story in mining".
- Coal prices are doubling in the past year, with specialty coal for coking (to make steel) tripling in part due to floods in Australia.
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- Helium is selling for \$90-100 per Mcf (thousand cubic feet).

- Last year I blogged about tellurium going from a few dollars a pound to around \$100 (it's remains one of the three most popular blog posts I've published).

I mention these resources particularly because all of them occur in Arizona and have the potential for much greater production. In recent months we have seen major investment from international companies in Arizona mining projects and proposed buy-outs of Arizona companies. It's the best indication possible of the world-class quality of the mineral resources we have in Arizona and their strategic and economic importance.

While the state's housing boom going into near freefall, with a loss of 3,200 jobs in construction in April alone, the mining industry is conversely having trouble finding enough workers to handle expanding and new mines. Mining added a modest 100 jobs in April but public statements by companies indicate hundreds more will be needed in the next few months.

For 60 years, the AGS has promoted and supported the geologic profession in Arizona with an emphasis on mineral resources. Today, the need for more geologists, the demand for minerals, and the wealth of Arizona's natural resources mean the Society can play as important a role as we ever have.

Recently for the first time, the USGS released the minerals commodities report it provides to the Federal Reserve Board as a key economic indicator. On a contrasting note, they show that production of construction minerals, such as gypsum and cement, are down from 4th quarter of 2007 and from a year ago, due to the slowing construction industry. But this has not dimmed the optimism that permeates the mining industry overall.

MEMBER AND OTHER NEWS

Welcome to new AGS members **Vince Matthews**, State Geologist, Colorado Geological Survey, and **Barry Watson**, Retired consultant, formerly with US Borax (Rio Tinto).

The **2008 Membership Directory** will be compiled in **early August** with the contact information of current members. Current membership is 353. If you've had a recent change in company, address, phone, or email, please contact Vice Secretary Keith Rodgers at jkroddgers@terracon.com.

The next scheduled meeting of the **AGS Executive Committee Meeting** on Wednesday evenings, **17 July** at 5:30 pm at 353 ENRB (USGS Building) on the U of A campus.

The **New Mexico Geological Society's 59th Fall Field Conference** will be held in Silver City & the Gila Wilderness Area on October 23-25, 2008. See <http://nmgs.nmt.edu/ffc/home.html> for additional information.

STEVE ENDER'S ABSTRACT, CONT. FROM PAGE 1

At the mine-scale, an understanding of the structure, fabric and mineralogy of how rocks break can be of tremendous value to mine operators as they look at better and more cost effective ways to improve fragmentation, cutting behavior, comminution and liberation. Economic geologists in particular need to apply our understanding of hydrothermal alteration and mineralization and models of fluid flow to hydrometallurgical problems, mitigation of acid rock drainage and metals sequestration, and finally to the many reclamation challenges.

Addressing these challenges is going to require better tools, new technology, and a different way of thinking. The number one tool that most geologists, engineers, and mine operators would like is a better drill with associated real-time data sensors, and down-hole or hole-hole

remote sensing "into the face". There are also a variety of initiatives in progress that are targeted on the fundamental challenges to more efficient extraction of lower grade and refractory ores. These two initiatives, in particular, require a new way of doing collaborative research and a new way of thinking because they are based on multidisciplinary approaches.

Take, for example, the emerging field of study in the biosciences called "biomimicry". The slogan is "innovation inspired by nature" and the definition is the application of methods and systems found in nature to the study and design of engineering systems and modern technology. The broader definition needs no modifications to apply to a new field of study inspired by nature that I would like to term: geomimicry. By analogy, there must be great opportunity and competitive space in the mining industry for the study of geosciences to contribute innovative solutions to our key technological challenges, if only we begin thinking differently and collaborating with researchers from different fields with little to no geologic background. That is geomimicry and that is our future.

Steve Enders is Sr. Vice President, Exploration, Newmont Mining Corporation and can be contacted at Steve.Enders@Newmont.com or (303) 837-5097.

2008 MEMBERSHIP DIRECTORY SPONSORSHIP

AGS is now accepting advertisements for the 2008 AGS Membership Directory. Our sponsors help offset the directory preparation and production expenses. Thanks to their generous support, the cost of membership continues to be very reasonable. 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: Aug. 8 deadline - directory will be published in early August. Advertisers will receive a copy of the directory.

Send to: Please email digital copies directly to Cori Hoag at choag@srk.com or mail a hard copy to: AGS, P.O. Box 40952, Tucson, AZ 85717. If you have questions, call Cori at (520) 400-4135. 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.



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publications, upcoming events,
and the dinner meeting schedule
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www.arizona-geological-soc.org.

AGS books & maps are sold at the
dinner meetings and by the
Arizona Geological Survey.

Enjoy your summer field work and geology adventures. As always, please keep us up-to-date as you move, or change jobs and email addresses.

2008 AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

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

Dues (check box) 1 year: \$20; 2 years: \$35; 3 years: \$50; full-time student (membership is free)

Name: _____ Position: _____

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

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