



Arizona Geological Society Newsletter

MARCH 2018

MARCH 6TH, 2018 DINNER MEETING

Who: Joe Wilkins, Jr. is the featured speaker. See abstract below.

Where: Sheraton Tucson Hotel and Suites, 5151 East Grant Road, (at the intersection of Grant and Rosemont on the North side of Grant in the **SABINO BALLROOM** (enter at northwest corner of the building) and go upstairs to the meeting room.

When: Cash Bar at 6 p.m.—Dinner at 7 p.m.—Talk at 8 p.m.

Cost: Members \$30, Guests \$33, Students Members free with online reservation (\$10 without).

RESERVATIONS ARE REQUIRED: Reserve on the AGS website (<http://www.arizonageologicalsoc.org/events>) by **11 am on Friday, March 2nd**. Please indicate Regular (Miso Honey Glazed Chicken), Vegetarian (Quinoa Roasted Vegetable Root) or Salad (Greek Salad with Chicken) meal preference. Please cancel by **Friday, March 2nd at 11 am** if you are unable to attend - no shows and late cancellations will be invoiced.

The February dinner meeting is sponsored by:



ABSTRACT

Piedras Verdes and Cuatro Hermanos, Sonora, Mexico - A Tale of Two Porphyries Joe Wilkins, Jr., Retired Consulting Geologist

Two porphyry copper deposits; Piedras Verdes (PV) and Cuatro Hermanos (CH) are located in central and southern Sonora about 150 km apart on NNE-SSW azimuth. Both have been mapped, sampled, drilled, beginning as the 1900s with activity continuing even today. A side-by-side comparison of the salient features of the deposit is as follows:

- Structural Setting - Cortez Terrain, both are in extended and rotated terrains.
- Basement Host Rocks and intrusions - granodiorite into Jurassic rocks.
- Breccia Pipes are present at both deposits.
- Alteration potassic-sericite-argillic-propylitic and sulfide mineralization are similar
- K-Ar Age Dates are similar - 67.3 my for Piedras Verdes and about 62-64 my for Cuatro Hermanos
- Announced Tonnages and Grades are similar - Piedras Verdes: 316 million tonnes at 0.39% Cu, Cuatro Hermanos: 353 million tonnes at 0.33% Cu plus 0.017% Mo

Continued on Page 2

However, Piedras Verdes is now an operating copper mine and Cuatro Hermanos is still an interesting deposit. **Why?**

Piedras Verdes is situated along a regional developed accommodation zone and has undergone extensive post-depositional structural rotation (including sub-horizontal breccia pipes) and enhanced structurally-induced permeability, which promoted the development of supergene blankets. The deposit was mapped at 1:10,000 (metric) scale, including lithology, structure, alteration, mineralogy, and FeOx ratios and found to be highly faulted and extended. Overall, the roots are to the west and top to the east.



Cuatro Hermanos was also mapped at 1:10,000 scale and also occurs in a rotated and latterly transported terrain. However, the top of the system is basically intact and upright as indicated by low-angle dips in the intruded volcanic carapace, sub-vertical intrusions and breccia pipes. Fracturing is mostly confined to veinlets and fault zones. The overall lack of post-transport permeability precluded the development of significant supergene mineralization.

The difference between an operating mine at Piedras Verdes and Cuatro Hermanos is the extensive, post-depositional, structural-induced permeability at Piedras Verdes, which is lacking at Cuatro Hermanos. Also the copper values at Piedras Verdes are derived from supergene copper, which is cheaper to process (heap leaching) than sulfide ores, which require considerable more processing.

ABOUT THE SPEAKER

Born in 1937, Joe Wilkins, Jr. is a third-generation Arizonan, who grew up in Phoenix and spent most summers at his grandparents' ranches north of Roosevelt Lake and later in Tonto Basin, where he learned to love the outdoors. After graduating from Phoenix Union High School in 1955, he served four years in the U.S. Air Force at Castle AFB near Merced, California.

Upon completing military service, Joe returned to Phoenix, got a job at Blakley's Gas Stations and enrolled at Phoenix Junior College. After several years working full time, going to school, getting married, and having kids, Joe moved the family to Tucson and enrolled in the geology program at the Arizona School of Mines at the University of Arizona, where he received a B.S. in Geophysics-Geochemistry in 1966 and an M.S. in Geology in 1974.

Joe began his professional career working for the Duval Corporation in 1967 and has worked as a geologist and/or geophysicist for a number of companies including McPhar Geophysics (1973-1975), Gulf Mineral Resources (1977-1983) and St. Joe American (1983-1989) as well as being an independent



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Continued on Page 3

consultant (1975-1977 and 1989-present).

During his career, Joe has evaluated numerous porphyry copper, moly, gold and IOCG deposits in western Canada, western United States, Sonora, Peru and Mongolia. He has been a long-time member of the Arizona Geological Society, where he served as Vice President of Field Trips in 1985, President in 1986, and was the editor for AGS Digest 15.

THANK YOU!

The following AGS members recently made generous contributions to AGS:

Richard Jones—M. Lee Allison Scholarship Fund

David Briggs—Greatest Needs Fund

Eric Seedorf—Courtright and M. Lee Allison Scholarships

Thank you to Crystals Unlimited for their generous donation!

Crystals Unlimited is donating the twelve 2018 mineral specimens for the small trophies that are presented to each speaker at the end of their talk. Crystals Unlimited exhibited at the main Tucson Gem and Mineral Show in the Tucson Convention Center from February 8-11 in booth 1600.

Arizona Geological Society Membership Stats (As of 2/25/2018)

Total Membership	Professional Members	Student Members	Organizational Members
430	345	78	7

MEMBER ANNOUNCEMENTS

John Gary Bolm (1945-2018)



Condolences to the family and friends of long-time AGS member John G. Bolm, who served as AGS Councilor ('93-'95; '99-'01), President ('95), Past-President ('96), and Treasurer ('97-98). He was the co-editor along with Frances Pierce of AGS Digest 20 Porphyry Copper Deposits of the American Cordillera, 1995. John was petrographer by education and worked for the USGS in Alaska (1973-1987) but made a mid-life change to move with his first wife Karen Sue Bolm to Tucson, where he learned Spanish fluently and became a criminal defense attorney serving local needs. His dry humor and story-telling will be missed. A service was held February 24th in Tucson. More of his life history is available in his obituary. He is survived by his second wife Irma Bolm.

AGS Digest 20 Porphyry Copper Deposits of the American Cordillera:

https://arizonageologicalsoc.org/resources/Documents/Digest%20Contents/AGS_DIG_20_TOC.PDF

Obituary:

<http://www.legacy.com/obituaries/tucson/obituary.aspx?n=john-gary-bolm&pid=188217802>

Notice of Vote to Change in the AGS Bylaws

During the January 2018 AGS Executive Committee meeting, the officers of the Society voted to amend Article IX, paragraph 2(d) of the AGS Bylaws. Accordingly, an announcement of this proposed change was made at our February dinner meeting, informing the membership that vote on this proposed change would occur at our March dinner meeting.

Should Article IX, paragraph 2(d) of the AGS Bylaws Existing Bylaws will be amended as follows:

Existing Bylaw

(d) 50-Year Members – members in good standing who have **maintained continuous membership for a minimum of 50 years** shall have the privileges of a full member of the Society and will be excused from further payment of dues.

Proposed Change

Continued on Page 5

(d) 50-Year Members - members in good standing who have **maintained membership for a minimum of 50 years** shall have the privileges of a full time member of the Society and will be excused from further payment of dues.

All full members of the AGS will be asked to vote on this proposed change either at the March dinner meeting or on SurveyMonkey via an email sent out by the Executive Committee.

AGS Executive Committee Members Needed!

Are you interested in the future of the **Arizona Geological Society (AGS)**? Would you like to make a meaningful contribution to the geology profession in Arizona? If so, the AGS needs you! The **Arizona Geological Society Executive Committee** is currently looking for volunteers – professional geologists and students – to serve in these four open committee positions:

- **Vice Treasurer**
- **Vice Secretary**
- **Councilor**
- **Councilor**

The Executive Committee meets **once a month from 6 pm to 7:30 pm**. Your small commitment of time each month can make a huge difference for the AGS. If you are interested in one of these volunteer positions and would like more information, please contact the Arizona Geological Society by email at:

info@arizonageologicalsoc.org

New Dinner Payment Policy

The AGS Executive Committee voted in November to institute a pre-pay policy for dinner meetings, beginning in January 2018. This action was necessary due to the numbers of no-shows who never pay for the meal they reserved, even after frequent reminders. This has resulted in financial losses that are not sustainable for the Society.

For those members who need assistance with navigating the online payment, please contact an officer and we will be happy to walk you through the process.

Hunting for Fire Agate in Arizona

By Leandra Marshall

Sometimes my dad and I like to go rockhounding in Arizona when we have a free weekend. This February, we decided to try our hand at collecting fire agate. We went to Round Mountain, a rockhounding site on BLM (Bureau of Land Management) Public Land. It was a surprisingly barren landscape scattered with small white rocks that were, on close inspection, actually agates. Vesicular basalt is also plentiful. We did not find anything gem quality, but I am still quite fond of the specimens I picked up. This collecting area could make a fun day or weekend trip from Phoenix and Tucson. However, a high-clearance vehicle is essential to make it to Round Mountain, as the road gets primitive soon after turning off Highway 70 and especially so after entering the rockhounding area.



Photo Credit: Round Mountain BLM Rockhounding Area, Leandra Marshall, 2018.



Photo Credit: Fire Agate, Leandra Marshall, 2018.

Directions to Round Mountain, Arizona - BLM Public Rockhounding Site:

From Highway 70, approximately 50 miles east of Safford past Duncan, travel into New Mexico to just beyond Milepost 5. Take the dirt access road on your right for 12 miles, following the signs to the Rockhound Area.

For information on Round Mountain Rockhound Area, visit these websites:

- <http://www.ohranger.com/round-mountain-rockhound-area>
- <https://www.recreation.gov/recreationalAreaDetails.do?contractCode=NRSO&recAreaId=2058>

For information about rockhounding on Bureau of Land Management land, visit this website:

- <https://www.blm.gov/basic/rockhounding>

US Geological Survey's Proposed 2019 Budget Takes a Shellacking

By Michael Conway, Arizona Geological Survey
 Arizona Geology eMagazine, February 13th, 2018

SUMMARY OF BUREAU APPROPRIATIONS
 (all dollar amounts in thousands)

How USGS would fare if Trump budget is adopted

Comparison of 2019 Request with 2018 CR

	2018 CR		2019 Request		Change	
	FTE	Amount	FTE	Amount	FTE	Amount
Current						
Surveys, Investigations, and Research.....	4,876	1,077,798	3,667	859,680	-1,209	-218,118
Subtotal, Current.....	4,876	1,077,798	3,667	859,680	-1,209	-218,118
Permanent						
Surveys, Investigations, and Research.....	0	52	0	52	0	0
Contributed Funds.....	6	644	6	644	0	0
Subtotal, Permanent.....	6	696	6	696	0	0

If President Trump’s 2019 budget becomes law, the US Geological Survey budget will fall 20% to \$859.7 million. Full-time employees, in turn, will be reduced from the current 4,876 to 3,677; a diminution of ~25%. It’s hard to imagine that such a dramatic decrease in financial and human resources would not adversely impact the USGS’ mission to ‘deliver integrated scientific understanding and forecasts of natural systems to improve the Nation’s economic well-being, reduce societal risks to hazards, and support and inform natural resource stewardship.’ The breadth and diversity of USGS programs makes it cumbersome to list all of the impacted programs, but here is a taste of the impacts; all dollar amounts are reported in thousands.

- Ecosystems -62,516
- Land Resources +103,242
- Climate & Land Use -148,261
- Energy & Mineral Resources +11,535
 - Env. Health -21,101
 - Natural Hazards -26,726
 - Water Resources -48,374
- Core Science Systems (includes mapping & NCGMP) -22,984

Continued on Page 8

USGS Program Overview

“The USGS was founded by an Act of Congress in 1879. The USGS delivers information to identify energy and mineral resources, find and protect groundwater, predict earthquake damage, identify hazards, guide transportation planning, inform managers of natural resources, and improve quality of life and economic vitality. The Bureau is responsible for monitoring and notification of earthquakes, volcanic activity, and landslides in the United States and collaborates with partners to improve hazard monitoring, explore vulnerable interdependencies, enhance emergency response, and speed disaster recovery.”

Read the original blog post here:

<https://www.usgs.gov/news/critical-minerals-united-states>

Read the full U.S. Geological Survey funding report here:

https://www.doi.gov/sites/doi.gov/files/uploads/fy2019_bib_bh049.pdf

Please contact the AGS Secretary if your company is interested in advertising in this monthly newsletter.

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~ ~ Welcome New Members ~ ~

James Davis David Reid Chris Wanless Russ Franklin

Joan Barry Wayne Edgin Seymour Sears Matthew Wetzel

Arizona Geological Society is grateful to Freeport-McMoRan, Inc. for their generous support of our student members! Freeport-McMoRan sponsored student dinners for the 2018 AGS monthly meetings.



AGS MEMBERSHIP APPLICATION OR RENEWAL FORM

YOU CAN RENEW OR SIGN UP as a new member and pay online. Please go to our website, arizonageologicalsoc.org. Or use the form below if you are more comfortable with the old school approach.

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

Dues (check box) 1 year: \$35; full-time student (membership is free)

NEW MEMBER or RENEWAL? (circle one) Date of submittal _____

Name: _____ Position: _____

Company: _____

Mailing Address: _____

Street: _____ City: _____ State: _____ Zip Code: _____

Work Phone: _____ Home Phone: _____

Fax Number: _____ Cellular Phone: _____

E-mail: _____ Check this box if you do not have an email address

All newsletters will be sent by email. If you do not have an email address, we will mail a hard copy to you, but we cannot guarantee timeliness.

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

Enclosed is a _____ tax-deductible contribution to the J. Harold Courtright or the M. Lee Allison