

GEOLOGICAL SOCIETY OF NEVADA NEWSLETTER

Geological Society of Nevada, 2175 Raggio Parkway, Room 107, Reno, NV 89512
(775) 323-3500 - Hours Tuesday -- Friday, 8 a.m. to 3 p.m. Monday by appointment.
Website: www.gsnv.org • E-mail: gsn@gsnv.org



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CALENDAR OF GSN EVENTS

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- Aug 13, 2015 Thursday WINNEMUCCA CHAPTER SUMMER BBQ**
The BBQ will be held at the Vesco City Park, Mizpah and Haskell St., Winnemucca, NV, 5:00 to 8:00 PM. **Food & Drinks Sponsored by ALS Minerals & Boart Longyear.** Please contact Matt Fithian at MFithian@silverstandard.com for more information. Details on page 7.
- Aug 16, 2015 SUNDAY 13TH ANNUAL SUMMER SILVER SERIES BBQ**
Guest Speaker: Rick Rule, Sprott U.S. Holdings, Inc. Topic: "Where Do We Go From Here? Thriving in Cyclical Markets", at Dan Kappes's home, 13045 Welcome Way, Reno, NV. 5:00 PM Drinks, 5:30 PM Potluck BBQ, 6:30 PM talk begins. **Sponsors for the evening are Kappes, Cassidy & Associates, Mine Development Associates, CGS Mule and MRC.** BBQ meat and drinks will be provided. Please bring a side dish, salad or dessert to share! Also bring your own lawn chair. RSVP by August 11th to Laura Ruud, gsn@gsnv.org or 775-323-3500. Details on page 3.
- Aug 20, 2015 Thursday ELKO CHAPTER SUMMER BBQ**
The Elko monthly BBQ will be held at the Duncan Little Creek Gallery Bar Backyard, 518 Commercial St. BBQ begins at 6:00 p.m. **Food & Drinks Sponsored by ALS Minerals.** For more info. Please contact Mark Travis, mark.william.travis@gmail.com. Details on page 7.
- Sept. 3, 2015 Thursday SO. NEVADA CHAPTER MEETING**
The monthly meeting will be held at the Las Vegas Natural History Museum at 900 N. Las Vegas Blvd. **Speaker and Topic: TBA.** Contact Josh Bonde for more information or if you'd like to give a talk!
Joshua.bonde@unlv.edu.

G.S.N. AUGUST MEETING SPONSORS



FROM THE PRESIDENT
Elizabeth Zbinden, G.S.N. President 2015-2016

As I write this, I'm still in the midst of the euphoria of the recently completed **Symposium**. It was the seventh Symposium, each one better than the last. **Thank you** to the brave band who put on the first one in 1987 and started us along this path. **Thank you** to this year's organizers too! And it wasn't just the organizing committee: all the presenters of talks, posters, core shacks, and exhibits provided the technical content that really made the event sparkle!

Those of you who attended the Symposium may have been privileged to be at the session where we voted to approve **honorary membership for Jean Cline**. Look for her nominating biography on page 13 of this newsletter. She is our first Honorary Member from the Southern Nevada chapter. Appropriate for someone who was instrumental in organizing the chapter back in 1991.

Even someone who has been around long enough to get dragooned into the presidency has new things to learn about GSN policies and procedures. It turns out that the dues year coincides with the officers' year. That means we ought to **pay our 2015-2016 dues now**, not wait till November and December. And *certainly* not wait till January! I have paid my dues; now I challenge you to do the same. Now is a good time to remind everyone of our new membership category, **Lifetime Membership**. Pay up front for 25 years, and you'll never again have to remember to send in annual dues.

Speaking of being dragooned into presidency, Nevada wasn't enough for our GSN Past-President **Jonathan Price**. He is continuing his leadership role in geosciences as 2015-2016 president of the **Geological Society of America**. Congratulate him the next time you see him!

Saving the best for last, I'm delighted to be able to announce to you that the Executive Committee and Board of Directors have voted to **promote Laura Ruud to Executive Manager**, from her former title of Office Manager. Congratulations Laura and thank you for doing such a great job for us!

***The Geological Society of Nevada's 2015 Symposium Committee
wishes to thank Newmont and Haywood for their Platinum Level
Sponsorship of the Symposium held in May!***



NEWMONTTM



CAPITAL  MARKETS
HAYWOOD

GSN August 16, 2015 Summer "Silver" Series BBQ

13th Annual Summer "Silver" Series BBQ with Guest Speaker:

Guest Speaker: Rick Rule, Chairman, Sprott U.S. Holdings, Inc.

Topic: "Where Do We Go From Here? Thriving in Cyclical Markets"

Date/Time: Sunday, August 16, 2015—Drinks @ 5:00 p.m., BBQ/Potluck Dinner @ 5:30 pm, Talk @ 6:30 pm

Where: Dan Kappes's Home, 13045 Welcome Way, Reno, Nevada

DIRECTIONS TO DAN'S HOUSE (Please Carpool if you CAN!):

Take U.S. 395 to Damonte Ranch Exit. Head west on Arrow Creek Parkway, turn right (north) on Thomas Creek Rd. Turn right on Welcome Way at the 4-way stop sign. Dan's house is downhill from the corner, the first house on the left (except for the corner house) 13045 Welcome Way. Call if you get lost – Dan's Cell phone is: 775-848-1981 and home phone: 775-622-1117. **Things to Bring Along: A Side Dish, Salad or Dessert to share and a Lawn Chair!**

Dan Kappes is buying the BBQ'd meat; MDA is providing the beer keg, CGS Mule is providing wine & water, and MRC is bringing the scotch!

"Where Do We Go From Here? Thriving in Cyclical Markets"

Guest Speaker Rick Rule, Sprott U.S. Holdings, Inc.

Rick Rule Biography:

Chairman, Sprott US Holdings, Inc.

Mr. Rule has dedicated his entire adult life to many aspects of natural resource securities investing. In addition to the knowledge and experience gained in a long and focused career, he has a worldwide network of contacts in the natural resource and finance worlds. As Director, President, and CEO of Sprott US Holdings, Inc., Mr. Rule leads a highly skilled team of earth science and finance professionals who enjoy a worldwide reputation for resource investment management.

Mr. Rule is a frequent speaker at industry conferences, and is interviewed for numerous radio, television, print and online media outlets concerning natural resource investment and industry topics. He is frequently quoted and referred to by prominent natural resource oriented newsletters and advisories. Mr. Rule and his team have long experience in many resource sectors including agriculture, alternative energy, forestry, oil and gas, mining and water. Mr. Rule is particularly active in private placement markets, having originated and participated in hundreds of debt and equity transactions with private, pre-public and public companies.

Sprott US Holdings, Inc. is a holding company made up of three separate and distinct companies: Sprott Global Resource Investments, Ltd., a FINRA Registered Broker/Dealer; Sprott Asset Management USA Inc., an SEC Registered Investment Adviser offering managed accounts; and Resource Capital Investment Corporation, an SEC Registered Investment Adviser managing partnerships. These three companies make up the US Subsidiaries of Sprott Inc. and are active in securities brokerage, segregated account money management and investment partnership management involving both equity and debt instruments, across the entire spectrum of the natural resource industry.

“FACES OF GSN”

MARY STOLLENWERK



Discovery. Landscape. People. Not, necessarily, in that order.

I now know that I was destined to be a geologist:

Stollenwerk: Stollen is German for a type of mine shaft. While at New Mexico Institute of Mining & Technology, Dr. Kuellmer stopped mid-sentence in crystallography class to ask me if I know the roots of my last name. He went on to diagram out the type of mine shaft known as a “stollen” in Germany.

My parents met in college while fulfilling their sole lab science class required at UW-Milwaukee. It was the geology class. They must not have paid much attention to the class, because my dad used to say our house was made of limestone (it was faced with a mica-garnet schist) and my mom would proclaim, dramatically, “all of this was created by glaciers” on **every** road trip we took through the Appalachian Mountains (that plate tectonics stuff was just a crazy theory).

My dad was conceived at Round Mountain, NV. In the mid ‘30’s, my grandparents went west in search of work. Grandma was the camp cook and Grandpa was a carpenter, and they spent some time at both Summitville, CO and Round Mountain, NV . I have some

treasured old photos from that time, including a post card from Round Mountain in 1936 proclaiming that “the gang was delighted with the news”, which was the birth of my father.

But how did I get here? Serendipity many times over.

Growing up in Lancaster County, PA, I attended an elementary school that was a “lab” for Millersville State College, a teacher school, that was quite free-form and hands-on learning. You could call some of the teachers “hippies”, for sure. We frequented a small natural history museum (The North Museum) that is attached to Franklin and Marshal College. It was just the right size to keep a kid interested. As a teen, I would ride my heavy steel Schwinn for long rides on country roads through the Pennsylvania Dutch farm country. The goal was ride until I didn’t see evidence of man – a vista without buildings or telephone wires. I felt the pull of The West, just like my grandparents. I probably applied to the oddest assortment of colleges, getting accepted at almost all of them. Never having been west of Milwaukee, I flew out to New Mexico to begin my freshman year at New Mexico Tech. Despite the bit of shock at first (there were trees in the photos in the catalogue), the drive from Albuquerque to Socorro showed me what a real “vista” could be. I figured I was a westerner for good.



Oddly, my first major at NMT was Mining Engineering (despite the fact that I had never seen a mine before in my life). On my first Mining 101 field trip, which was combined with a geology class, I knew that I was not with “my people”. As my fellow Mining Engineering students were intently interested in scheduling haul packs to go up and down, and up, and down, and up, and down, and..., I thought “man, I am NOT with my people”. But those geology majors sure seemed to be interested in those rocks, which were awfully colorful. My sophomore year, I took Geology 101 and, yep – that was for me. My mining Engineering professor accused me of joining “those hippies” (aha!), right before confessing that his first degree was geology.

I worked in the Hydrology lab, and took a summer job as Joan Gabelman’s field assistant for her MS field work in Northern New Mexico on the Rio Bra-

zos. Our closest neighbor was a Mennonite cowgirl from Lancaster, PA.

I graduated in 1987, expecting to become a vadose zone hydrologist somewhere, but my first job as a college graduate was at the Socorro Pizza Hut. Not my first pick, but, hey, one has to get the rent somewhere. One day, I waited on a grad student who asked me “are you still looking for work” (really?) and I was directed to Dr. Norman’s office. Will Wilkinson of Westmont Mining had called him looking for a student to come and take soil samples (cont. on page 5)

(cont. from page 4)

near Elko, NV for “6 weeks, maybe longer”. I packed up my bike (now a mountain bike – they were the new thing back then) and a few suit cases and went farther west. I had not thought of working in exploration, but here I was on the geochemical sampling crew for Jeff Jaacks. The Westmont crew didn’t shake me in 6 weeks or even 6 months. I stayed on and did everything from claim staking and drill rig sitting, to working with the geochemical data. I was the first to go through the Nancy Johnson Mentoring Program.

It seemed I needed to get a Master’s degree, so I wound up in Golden at the Colorado School of Mines. I studied mineral deposits class, and went on ALL the field trips possible: Canadian Shield, South Africa, Nevada, Mexico, Leadville. I was also fortunate enough to be a founding member of the first Society of Economic Geology Student Chapter EVER. Looking at the thriving global spread of SEG Student Chapters, it is difficult to imagine the organization without them. We organized a lecture series, field trips, and conferences. While we were in the midst of planning a conference on “The Geology and Minerals Deposits of the Soviet Union”, that Union fell. With that region opening to the west, our conference was a huge success, and demonstrated to me how valuable participation in organizations is.



I spent summers working, including one summer in Venezuela taking stream sediment samples in a remote helicopter (poorly) supported camp with my friend, Phil Allen, who had graduated the year before. The evening I arrived, they gave me a tour and I asked where our water came from. They showed me a barrel catching rain water. There were guppies in that water. There were also spikes on trees, snakes and wild boars everywhere, ants that give you a 24 hour fever when they bite, and electric eels in the river we bathed in. It is hard to say “never again” to a career where I routinely had the theme from the Indiana Jones in my head, swinging across streams on vines and crossing paths with a jaguar (he just looked at us and kept loping along). The indigenous population also took an interest in us, and came by camp regularly.

A few years later, I was offered a job I could not refuse - to go look for diamonds in Venezuela. Off I go to South America, again. There were diamonds being mined from the laterite, and we were looking for the source kimberlites. It was better supported logistically than the last gig, but offered other challenges.

I eventually was back in Denver, and found myself on a phone call with someone calling from Ghana, asking me if I wanted to come to work in Burkina Faso. I agreed without being sure exactly where that was, I have to admit. I got off the phone and rode my bike (a Specialized Rock Hopper) down to the Tattered Cover to buy a big Rand McNally Atlas that night. Oh! Upper Volta! And off I went to West Africa to work for International Gold Resources on the Poura and Youga projects. I certainly learned a healthy respect for metadata on those projects. And French (after a fashion). An orphaned lamb named Andre somehow adopted me. Yes, Mary had a little lamb. The other expats thought that was just hilarious.



After IGR changed hands, I joined Placer Dome in West Africa. With Placer, I worked on a couple of green fields projects in Cote d’Ivoire, spent some time logging core at the Samira project in Niger, with further travel in Burkina Faso and Mali looking at properties. Lateritic profiles became my frenemy – it plays games with the gold. My favorite country remained Burkina Faso. The people were so kind and honest. I once left my wallet in a taxi in Ouagadougou; I just jumped out and went into an office compound. I realized I didn’t have it on me and I ran back out, watching the taxi headlights disappear in the distance. I had my passport in there, as well as a decent amount of cash. I hear a “psst” from the side of the road – “Madam!”. Some boys selling cigarettes were holding it for me. They would not take any reward, as that would imply that they would have stolen it. I did purchase their cigarettes – I just didn’t take them with me. This type of experience with the people was common.

In 1998, I returned to the US from Africa, and began consulting in the Denver area. I trained up in GIS and kept mildly busy during this slow time in our industry. Some field work came my way also, taking me to northernmost Quebec, South Dakota, and, importantly, Suriname. In Suriname, I worked with quite a motley crew of great (cont. on page 6)

(cont. from page 5)

geologists, putting the first holes into Gowtu Bergi (creatively, “Gold Hill” in Sranang Tongo). At Gowtu Bergi, the laterite had concentrated the gold and artesianal miners, called Pork Knockers in Suriname, were mining. It is interesting drilling a structurally complex deposit for a bauxite company (ah – nope, not flat, not near surface...). Much work has been done on this property since, with Newmont now permitted to mine. However, my most important discovery in Suriname was of a different nature. People often ask us how we met. Derreck Sadjoeri has an elaborate story about how I ordered him off the internet. I am glad to have this platform to set the story straight. We met on this project, and he kissed me first.



In 2005, Mary Doherty suggested that I apply to run a prep lab in Winnemucca. Derreck and I figured that if we needed two jobs in exploration, we had better move to Nevada. For once, I moved for a job to a place that I had actually been before! In my 10 years with ALS Minerals I am still learning this industry, but from another viewpoint. While I certainly miss having my own projects, I thank my clients for letting me be a part of their projects. Sorry, but I just can’t tell you about any of them.

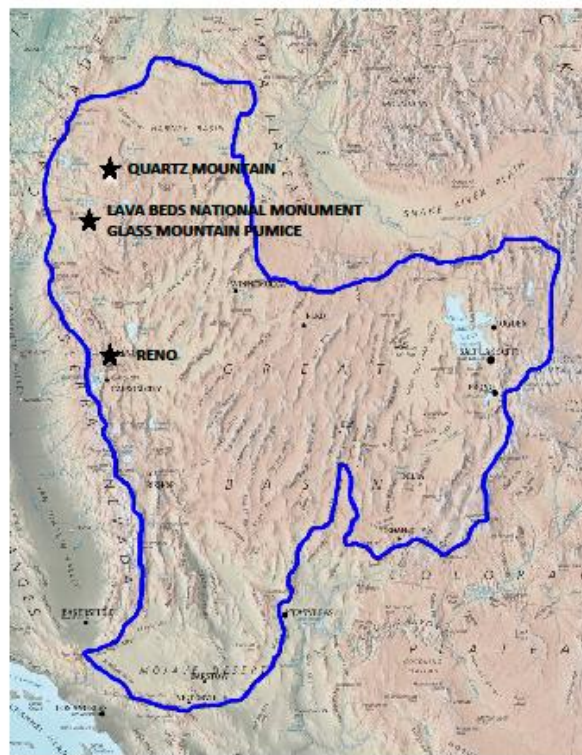
I could say that the possibility of discovery is what had driven my career – I loved to be the first to see what came out of that drill hole. It would not be wrong, just incomplete. It is the people I met, and the landscapes I was treated to that make a career in geology so worthwhile. To that end, my involvement with GSN has been very rewarding. As a member, Publications Chair, and Symposium committee member, I have been fortunate to be involved with events that advance the science of exploration, as well as provide a network of community. I have to share an outsider’s impression of GSN. My mother once attended an Elko GSN BBQ. She said she met so many interesting people, and that “the geologists must be the intelligentsia of Nevada”.

I am still going on every field trip possible, and I now ride a Specialize Roubaix.

SAVE THE DATES!

GSN FALL FIELD TRIP—OCTOBER 17-18, 2015!!

Come with us as we journey to the far northwestern reaches of the Great Basin on Saturday and Sunday, October 17 and 18, 2015. On Saturday we will travel to Lakeview, Oregon to visit Alamos Gold and review their exploration program of the Quartz Mountain epithermal gold deposit. After an overnight stay in Klamath Falls, Oregon, we will continue our trip on Sunday with an exploration of the lava tubes at Lava Beds National Monument in California. The last stop on our trip will be a visit to the Glass Mountain pumice deposit in the Medicine Lake Volcanic Complex. Complete with spectacular views of Mt. Shasta, this promises to be a field trip with something for everyone!



Sponsorship opportunities will be available. Please contact the GSN Office if you would like to sponsor dinner, drinks, lunch or a van! Email: gsn@gsnv.org or call 775-323-3500.

G.S.N. SUMMER BBQS

G.S.N. WINNEMUCCA CHAPTER SUMMER BBQ

THURSDAY, August 13, 2015
5:00 p.m.—8:00 p.m.

Come meet the New officers and get
reacquainted with old friends.

Location: Vesco City Park
Winnemucca, Nevada
(Mizpah St. and Haskell)

Food and Drinks Sponsored by:



THANK YOU TO THE ELKO CHAPTER
JUNE 2015 MEETING SPONSORS



G.S.N. ELKO CHAPTER AUGUST BBQ

THURSDAY, August 20, 2015
6:00 p.m.—9:00 p.m.

Duncan Little Creek Gallery Bar
(Backyard)
518 Commercial Street
Elko, Nevada

Food and Drinks Sponsored by:



THANK YOU TO THE ELKO CHAPTER
JULY 2015 SUMMER BBQ SPONSORS



G.S.N. Golf Tournament 2015 Wrap Up



Volunteers Elizabeth Zbinden (left) and Cami Prenn (right) hand out a raffle prize to lucky winner Johnnie Taylor!



The 1st Place Team—Dan Pace, Ken Cunningham, Patrick Quillen and Tyler Hill!



Brenna Keegan won the prize for the Women's Longest Drive!



Happy raffle prize winner—Chris Throop!



Patrick Mohn teeing off on Hole #1.

The G.S.N.'s 2015 Annual Golf Tournament was held on June 13, 2015 at the Washoe County Golf Course in Reno, NV. The **1st Place Team** included old pro Ken Cunningham; newer pro Dan Pace and UNR Mackay Students Tyler Hill and Patrick Quillen. **2nd Place** team was Cody Unger, Tony Moore, CJ Larsen and Sarah Lightner. The **3rd Place** team included Eric Dominguez, Mark Franey and Stuart Moller. Other winners of the day were Tom Burkhart who won "**Men's Closest to the Hole**" on #3 and Sarah Lightner who won "**Women's Closest to the Hole**" on #3. **Longest Men's Drive** went to Giovan Cholico and **Longest Women's Drive** went to Brenna Keegan (who drove it ALMOST to the same spot as the longest men's winner!). Many golfers and their guests won great raffle prizes all donated by the people and companies on the next page. The GSN Foundation benefited \$2,810.00 from the sales of mulligans and raffle tickets!

Special thanks to **American Assay Labs** for being the Title Sponsor of the event this year! Thanks too to the hole-in-one sponsors and individual prize sponsors **Argonaut Gold, Schlumberger Water Services, Kinross Gold and Bureau Veritas Minerals**.

We appreciate **Boart Longyear** for providing beer koozies to keep our drinks cold on the hot June day and finally **thanks to the staff of Bureau Veritas Minerals** for their help in organizing and working at the tournament, handing out snacks and cold drinks to the golfers. Everyone had a great time! (photos by Laura Ruud)



Bureau Veritas Minerals employees, Wannetta Garman, Lonnie Vance, Christina Teran, Rob Teran, Dimitri Siotas and Shona Garman after a long day making sure the GSN golfers had plenty of snacks and cold drinks out on the course.

Thank you to the companies who made cash contributions towards the success of the GSN Golf Tournament!



MINERALS





The Geological Society of Nevada
Wishes to thank our generous raffle prize donors:



Thank You, Thank You, Thank You, Thank You!



Eric Struhsacker

Clancy Wendt



Everything but the mule, anywhere in the world!



MINERALS



Enviroscientists, Inc.



CASCADe DRILLING, INC.



Kel Buchanan

The GSN wishes to especially thank
AMERICAN ASSAY LABORATORIES
 for being the Title Sponsor of the
 GSN 2015 Golf Tournament!



GSN 2015 SYMPOSIUM WRAP-UP

By all accounts the G.S.N. 2015 Symposium held May 15-23, 2015 was a huge success! Over 1,300 attendees gathered at the J.A. Nugget Casino Resort in Sparks/Reno, Nevada to attend technical sessions, short courses, an SEG Forum, pre- and post-meeting field trips and several social events! Many people commented that this was the best Symposium that the G.S.N. has ever organized. The tradition of GSN excellence goes on!

Molly Hunsaker of Hunsaker Inc., took the bull by the horns and volunteered to Chair this meeting over 3 years ago. She did an excellent job of guiding the group of about 40 volunteers who each got their part done on time and done well. Moira Smith and John Muntean, Technical Program Chairs, gathered a stellar list of speakers that made the 2015 Symposium's technical program a real standout in the international geological community. Many volunteers worked tirelessly to organize short courses, field trips, exhibitors, luncheons and social events; while many others were behind the scenes doing registration, accounting, advertising, announcements, programs, fund-raising, facilities management and EDITING the volumes! Thanks to Bill Pennell and Larry Garside (plus all of the volunteers who reviewed papers) the Symposium Proceedings volumes and CDs were available at the meeting for the first time ever! The GSN Symposiums would not take place without ALL of the efforts of these volunteers. We'd also like to recognize Andrea Rascati, GSN Symposium Office Manager, who worked tirelessly to make sure everyone's questions were answered and all went smoothly.

Some of the highlights of the Symposium included Harry Cook's Keynote Address about the Western No. American Paleozoic carbonate platform & basin depositional environments; the SEG Forum where a lively discussion took place about Carlin-like gold deposits; luncheon talks by Chuck Thorman, Andreas Audéat and Brent Cook; a first ever Drillers and Mud short course held in Elko; great field trips to really interesting sites all over Nevada; and a really fun social event where people gathered to meet with their college alumni buddies and/or past co-workers from many "dead companies".

The GSN 2015 Symposium was one that will be remembered and talked about for a long time to come. They are still crunching the numbers but it's looking to be one of the most successful Symposiums we've ever had. See page 12 for a list of all of the names of the hard-working volunteers on the Organizing Committee!



2015 Symposium photos: (Clockwise from top left) 1. Welcoming remarks in main ballroom; 2. Platinum sponsor signs; 3. some of the Organizing Committee at Exhibits Hall; 4. Mario Desilets & Jesse Wellman in the Exhibit Hall; 5. more of the Organizing Committee at Poolside Terrace; 6. Jeff Phinisey and Jon Price manning the GSN Exhibit Booth; 7. Dave Shaddrick, Dick Kehmeier and Molly Hunsaker, Chair, at the Alumni/Dead Co. Party; 8. Ex-Santa Fe Pacific group at the Dead Co. Party; Center photo: Molly Hunsaker & Brooke Mills cutting the ceremonial Symposium cake. (Photos courtesy of Terri Garside, Eric Ruud and Laura Ruud)

THANK YOU TO ALL OF OUR 2015 SYMPOSIUM PATRONS AND SPONSORS



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MINERALS



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THANK YOU TO THE 2015 SYMPOSIUM ORGANIZING COMMITTEE!!

Chairpersons: Molly Hunsaker & Donald Harris

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Terri Garside, Laura Ruud & Opal Adams

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Fleetwood Koutz and Vic Ridgley

Committee Advisors:
Jonathan Price & Eric Ruud



National EWP sponsored a FUN night at the Reno Aces Game—July 24th!

National EWP hosted 128 GSN members and family at the 4th Annual GSN Reno Aces Night on July 24, 2015. It was a beautiful night for baseball, BBQ and beer (or whatever you wanted to drink!). The food was delicious, the bar was open and the Aces scored a LOT of runs to win the game over in-state rivals, the Las Vegas 51s. The final score was 12-2 and the Aces scored seven runs in the first inning to set the tone for the rest of the game.

The evening ended with a great fireworks show and everyone went home happy! Thanks go out to the crew from National EWP: James Stephens, Brian Johnson, Jim Bruneio and Jacob Gallagher, who all travelled from other places to be at the game. James and Brian had to drive to Elko that night after the game so they really went the extra mile!



Aces Photos: (clockwise from top left) 1. Tom John, Jacob Gallagher, Ana John & Jim Bruneio; 2. Neil & Cami Prens; 3. John Marma & family; 4. Steve Weiss & Eric Ruud, 5. Chris & Alan Coyner, Alan Driscoll & Thais Armenta; 6. Brian Johnson, James Stephens, Lori Carpenter & Jim Bruneio, 7. Alexandra Wheatley, Sean Diggins & Ralston Pederson



GSN Lifetime Honorary Membership given to Dr. Jean Cline

GSN Southern Nevada Chapter President Joshua Bonde, nominated **Dr. Jean Cline** for **GSN's Lifetime Honorary Membership** award. Her nomination was approved unanimously, and she was awarded the honor during the opening session of the GSN 2015 Symposium on May 18, 2015. Lifetime Honorary Membership is presented to members who have made outstanding contributions to the advancement of the geological sciences in Nevada. Congratulations Jean and Happy Retirement!

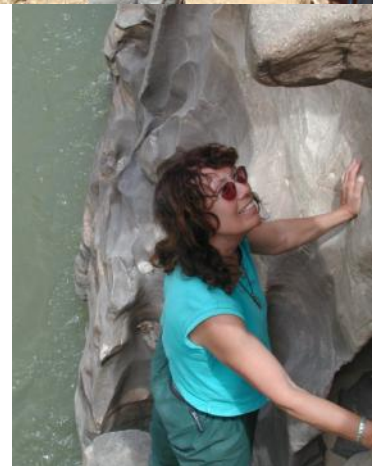
Biography—Jean Schroeder Cline, Ph.D.

Jean Cline hails from the town of Sheboygan, Wisconsin. She completed her Bachelors of Science in Geology from Wisconsin State University in Platteville in 1970. From there she went into industry, working as an exploration geologist for Inspiration Development Company of Arizona for a decade. While at Inspiration she did base and precious metal and strategic mineral exploration. After being in industry for a bit Jean pursued her Master's degree in Geology from the University of Arizona, working on fluid inclusions and alteration at the Sixteen to One silver-gold deposit, while still working as an exploration geologist during the summer. After her work in Arizona she went on to earn a doctorate from Virginia Polytechnic Institute and State University in 1990. In Virginia, her studies focused on physical and chemical aspects of fluid evolution in hydrothermal ore systems.

Upon completion of her doctorate Jean joined the faculty at the University of Nevada Las Vegas, where she has been ever since. While at UNLV Jean has been named a Ralph J. Roberts Distinguished Lecturer, and she has been invited internationally as a keynote speaker and short course instructor. She was invited to be the lead author of the paper in the Society of Economic Geologist's 100th Anniversary Volume titled: *Carlin-type Gold Deposits in Nevada, USA: Critical Characteristics and Viable Models* (2005). She has authored or co-authored over 50 professional papers in economic geology, several of which are significant contributions to our understanding of Carlin-type ore deposits.

Her students and post-docs have gone on to work in industry all over the world. In addition to her academic work, Jean was one of the founding members of the Southern Nevada Chapter of the Geological Society of Nevada. She has served as the Chapter's President and continues to be a regular attendee and occasional speaker at Chapter meetings. Jean retired at the end of the Spring 2015 semester.

Jean leading a class of elementary school kids from Las Vegas on an earth science field trip in southern Nevada



Jean on a 2015 Symposium Field Trip to the Pequops (with Kyle Larson from Barrick)

*Thank you to our
generous donors in June!!*

G.S.N. FOUNDATION
Raymond Irwin

ROCK TALK

[Study hints that ancient Earth made its own water — geologically](#)

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A new study is helping to answer a longstanding question that has recently moved to the forefront of earth science: Did our planet make its own water through geologic processes, or did water come to us via icy comets from the far reaches of the solar system?

The answer is likely “both,” according to researchers at The Ohio State University— and the same amount of water that currently fills the Pacific Ocean could be buried deep inside the planet right now.

At the American Geophysical Union (AGU) meeting on Wednesday, Dec. 17, they report the discovery of a previously unknown geochemical pathway by which the Earth can sequester water in its interior for billions of years and still release small amounts to the surface via plate tectonics, feeding our oceans from within.

In trying to understand the formation of the early Earth, some researchers have suggested that the planet was dry and inhospitable to life until icy comets pelted the earth and deposited water on the surface.

Wendy Panero, associate professor of earth sciences at Ohio State, and doctoral student Jeff Pigott are pursuing a different hypothesis: that Earth was formed with entire oceans of water in its interior, and has been continuously supplying water to the surface via plate tectonics ever since.

Researchers have long accepted that the mantle contains some water, but how much water is a mystery. And, if some geological mechanism has been supplying water to the surface all this time, wouldn't the mantle have run out of water by now?

Because there's no way to directly study deep mantle rocks, Panero and Pigott are probing the question with high-pressure physics experiments and computer calculations.

“When we look into the origins of water on Earth, what we're really asking is, why are we so different than all the other planets?” Panero said. “In this solar system, Earth is unique because we have liquid water on the surface. We're also the only planet with active plate tectonics. Maybe this water in the mantle is key to plate tectonics, and that's part of what makes Earth habitable.”

Central to the study is the idea that rocks that appear dry to the human eye can actually contain water—in the form of hydrogen atoms trapped inside natural voids and crystal defects. Oxygen is plentiful in minerals, so when a mineral contains some hydrogen, certain chemical reactions can free the hydrogen to bond with the oxygen and make water.

Stray atoms of hydrogen could make up only a tiny fraction of mantle rock, the researchers explained. Given that the mantle is more than 80 percent of the planet's total volume, however, those stray atoms add up to a lot of potential water.

In a lab at Ohio State, the researchers compress different minerals that are common to the mantle and subject them to high pressures and temperatures using a diamond anvil cell—a device that squeezes a tiny sample of material between two diamonds and heats it with a laser—to simulate conditions in the deep Earth. They examine how the minerals' crystal structures change as they are compressed, and use that information to gauge the minerals' relative capacities for storing hydrogen. Then, they extend their experimental results using computer calculations to uncover the geochemical processes that would enable these minerals to rise through the mantle to the surface—a necessary condition for water to escape into the oceans.

In a paper now submitted to a peer-reviewed academic journal, they reported their recent tests of the mineral bridgmanite, a high-pressure form of olivine. While bridgmanite is the most abundant mineral in the lower mantle, they found that it contains too little hydrogen to play an important role in Earth's water supply.

Another research group recently found that ringwoodite, another form of olivine, does contain enough hydrogen to make it a good candidate for deep-earth water storage. So Panero and Pigott focused their study on the depth where ringwoodite is found—a place 325-500 miles below the surface that researchers call the “transition zone”—as the most likely region that can hold a planet's worth of water. From there, the same convection of mantle rock that produces plate tectonics could carry the water to the surface.

One problem: If all the water in ringwoodite is continually drained to the surface via plate tectonics, how could the planet hold any in reserve? (Cont. on page 15)

Activity Update

Mike Brady, June 2015

www.activityupdate.com

NEVADA

Waterton Precious Metals Fund II announced that it acquired the Mount Hamilton Property from Solitario Exploration and Royalty Corp. and Ely Gold and Minerals Inc. for \$30,000,000. (reserve = 20,454,000 tonnes @ 0.83 gpt Au, 6.8 gpt Ag proven+probable) *Press Release:* June 11

NuLegacy Gold Corp.(70%) announced that recent drill results at the Iceberg Project include 96.0-114.3 meters @ 0.52 gpt Au (RHB-47); 42.7-48.8 meters @ 0.42 gpt Au (RHB-48); 38.1-109.7 meters @ 0.78 gpt Au (RHB-49) and 57.9-73.1 meters @ 1.68 gpt Au (RHB-50). *Press Release:* June 11

Tertiary Minerals plc. announced that based on recent drill results at the MB Project, resources aggregate 6,100,000 tonnes @ 10.8% CaF₂ indicated and 80,300,000 tonnes @ 10.7% CaF₂ inferred. (was 8,900,000 tonnes @ 10.3% CaF₂ indicated and 29,500,000 tonnes @ 10.4% CaF₂ inferred) *Press Release:* June 17

Scorpio Gold Corp.(70%) announced that recent drill results at the Mineral Ridge/Bluelite Project include 102.11-106.68 meters @ 1.47 gpt Au (MR151404); 33.53-36.58 meters @ 0.57 gpt Au (MR151406); 45.72-48.77 meters @ 1.77 gpt Au (MR151407) and 71.63-82.3 meters @ 1.45 gpt Au (MR151410). (resource @ Mineral Ridge = 4,230,000 tonnes @ 1.47 gpt Au indicated) *Press Release:* June 22

Pilot Gold Corp.(79.1%) announced that recent drill results at the Kinsley Mountain Project include 266.7-285.0 meters @ 3.46 gpt Au (PK-208); 231.6-245.4 meters @ 2.95 gpt Au (PK-210); 187.5-189.0 meters @ 1.38 gpt Au (PK-211) and 128.0-131.1 meters @ 0.89 gpt Au (PK-212). *Press Release:* June 23

Nevada Copper Corp. announced that recent drill results at the Pumpkin Hollow Project include 449.0-458.7 meters @ 0.18% Cu, 0.02 gpt Au (NC15-08); 293.7-410.0 meters @ 0.53% Cu, 0.05 gpt Au (NC15-11); 451.7-502.3 meters @ 0.75% Cu, 0.08 gpt Au (NC15-12) and 244.7-269.1 meters @ 0.26% Cu, 0.04 gpt Au (NC15-15). (resource = 485,840,000 tonnes @ 0.45% Cu, 0.03 gpt Au measured+indicated) *Press Release:* June 24

Midway Gold Corp. announced that it filed for bankruptcy under Chapter 11 due to the lack of operational success at the Pan Mine. (reserve = 48,311,000 tonnes @ 0.56 gpt Au proven+probable) *Press Release:* June 22

Nevada Zinc Corp. announced that recent drill results at the Lone Mountain Project include 126.49-245.36 meters @ 9.58% Zn, 0.74% Pb (LM15-27) and 59.44-67.06 meters @ 2.70% Zn, 0.10% Pb (LM15-28). *Press Release:* June 1

Waterton Precious Metals Fund II announced that it acquired all of the exploration assets (less the Hycroft Property) of Allied Nevada Gold Corp. (bankrupt) for \$17,500,000. (resource @ Wildcat = 12,540,000 tonnes @ 0.85 gpt Au inferred) *Press Release:* June 19

(Earth's water, cont. from page 14)

For the research presented at AGU, Panero and Pigott performed new computer calculations of the geochemistry in the lowest portion of the mantle, some 500 miles deep and more. There, another mineral, garnet, emerged as a likely water-carrier—a go-between that could deliver some of the water from ringwoodite down into the otherwise dry lower mantle.

If this scenario is accurate, the Earth may today hold half as much water in its depths as is currently flowing in oceans on the surface, Panero said—an amount that would approximately equal the volume of the Pacific Ocean. This water is continuously cycled through the transition zone as a result of plate tectonics.

“One way to look at this research is that we’re putting constraints on the amount of water that could be down there,” Pigott added.

Panero called the complex relationship between plate tectonics and surface water “one of the great mysteries in the geosciences.” But this new study supports researchers’ growing suspicion that mantle convection somehow regulates the amount of water in the oceans. It also vastly expands the timeline for Earth’s water cycle.

“If all of the Earth’s water is on the surface, that gives us one interpretation of the water cycle, where we can think of water cycling from oceans into the atmosphere and into the groundwater over millions of years,” she said. “But if mantle circulation is also part of the water cycle, the total cycle time for our planet’s water has to be billions of years.”



**National Science Teachers Association
in Reno on October 22-24, 2015
GSN Volunteers Welcome**



As many as 5,000 teachers are expected to attend the National Science Teachers Association area conference in Reno October 22-24 (Thursday-Saturday), 2015.

The Minerals Education Coalition of the Society for Mining, Metallurgy, and Exploration is coordinating activities at a 10x20-foot geology and mining booth in the exhibition hall at the Reno-Sparks Convention Center. They will bring various posters and handouts for the teachers to take back to their classrooms.

The Education Committee of the Nevada Mining Association is gathering samples of ores and minerals (1,500 each) to give away, and the Mackay Rockhounds (UNR's geology club) will be helping to put the samples and labels in plastic bags. We expect to get gold ore from Round Mountain, silver ore from Coeur Rochester, copper-silver ore from Phoenix, diatomite from EP Minerals in Pershing County, gypsum from Empire, barite from Lander County, and pumice from California.

GSN volunteers will be most welcome to assist in explaining to teachers the importance of mining and the uses of the metals and industrial minerals as they pick up their samples. Booth times are:

11:00 a.m. to 5:00 p.m. on Thursday, October 22

9:00 a.m. to 3:00 p.m. on Friday, October 23, and

9:00 a.m. until noon on Saturday, October 24.

If you think you can help, please send Rachel Grimes, MEC Outreach Coordinator, <grimes@smenet.org>, and Jon Price, GSN Past President, <JonathanGPrice@alumni.ls.berkeley.edu>, an e-mail.

OTHER UPCOMING EVENTS

4, August—Arizona Geological Society meeting, “Volcanoes in the Back Yard” presented by Dan Lynch. 6 p.m. to 9 p.m. at the Sheraton, 5151 E Grant Rd. (& Rosemont), Tucson, AZ To register click on the link: www.arizonageologicalsoc.org/event-1929071

10-12, August 12th International Congress for Applied Mineralogy (ICAM) in Istanbul/Turkey, on 10 August – 12 August 2015. Visit the website for more information: <http://icam2015.org/>

24-27, August—13th Biennial SGA 2015 meeting, Mineral Resources for a Sustainable World, at the Centre Prouvé, Nancy, FRANCE. Detailed schedule now available: [Programme_SGA2015](#). or visit the website at: <http://sga2015.blog.univ-lorraine.fr/>

12-16, September—Heap Leach Solutions 2015, Peppermill Resort Hotel Casino, Reno, Nevada. For more information see add on page 17 or visit the website: www.heapleachsolutions.com.

18-20, September—the NMEC (Nevada Mineral Exploration Coaliton) is hosting the 3rd Annual Great Basin Rendezvous at Camp Lamoille near Elko, NV. Contact Dave Shaddrick, DShaddrick@aol.com or Warren Thompson, wthompson@premiergoldmines.com for more information.

27-30, September—SEG 2015: World-Class Ore Deposits: Discovery to Recovery, Hobart, TAS, Australia. Visit <http://www.seg2015.org/> for details and to register online.



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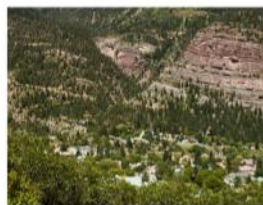
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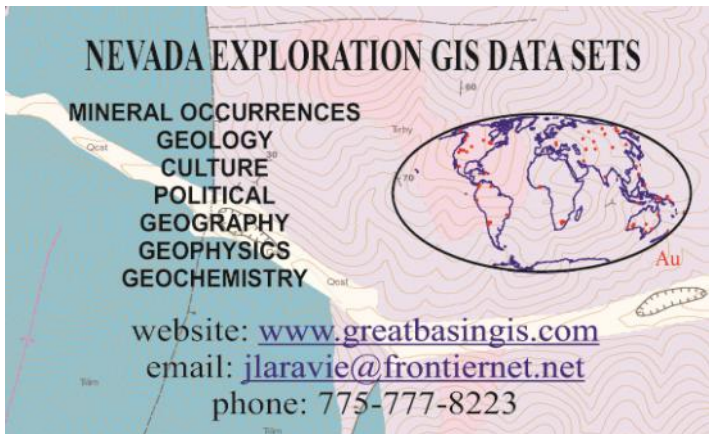


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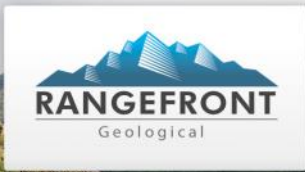
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