

# 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.  
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## CALENDAR OF GSN EVENTS

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**Nov. 6, 2014 Thursday** **SO. NEVADA CHAPTER MEETING (every 1st Thursday of the month)**  
The monthly meeting will be held at the Las Vegas Natural History Museum at 900 Las Vegas Blvd. N., Las Vegas, NV. Begins at 5:30 p.m. **Speaker: James Bell, NASA-Ames Research Center, Mountain View, CA. Title: "The Lunar Atmosphere and Dust Environment Explorer (LADEE): The Mission and Preliminary Results". Sponsor for the evening: SCHLUMBERGER.** Please contact Josh Bonde for more information [Joshua.bonde@unlv.edu](mailto:Joshua.bonde@unlv.edu). Details & abstract on page 8.

**Nov 20, 2014 Thursday** **WINNEMUCCA and ELKO CHAPTERS' 4TH ANNUAL JOINT MEETING!!**  
This Joint Meeting will be held at the Battle Mountain Civic Center in Battle Mountain, NV. Appetizers/drinks at 6:30 PM, Talk at 7:30 PM. **Speaker: Harry E. Cook, Carbonate Geology LLC. Title: "Discard the Name Comus Formation—New Predictive Carlin-Type Gold-Host Models for the Getchell Trend: Will the Real Cambrian—Ordovician Comus Formation Please Stand Up and Reveal Your True Birth Places?". Food & Drinks Sponsored by: BARRICK GOLD EXPLORATION and NEWMONT MINING CORPORATION.** Please contact Jon Powell at [jon.powell@newmont.com](mailto:jon.powell@newmont.com) or Pat Donovan at [pat.donovan@newmont.com](mailto:pat.donovan@newmont.com) for more information. Transportation & Other Details plus abstract on pg. 9.

**Nov 21, 2014 Friday** **GSN MEMBERSHIP MEETING (Every 3rd Friday of the month)**  
The monthly meeting will be held at the Reno Elks Lodge, 597 Kumble, Reno. Drinks at 6:00 pm, Dinner at 7:00 pm, Talk at 8:00 pm. **Speaker: Stephen Peters, USGS-Reno. Title: "Results of Three Recent Missions to the REE-, U-, F-, and P-bearing Khanneshin Carbonatite in Southern Helmand Province, Afghanistan". Sponsor for the evening: ENVIROTECH DRILLING LLC.** Please contact Laura Ruud for dinner reservations at [gsn@gsnv.org](mailto:gsn@gsnv.org). Details and abstract on page 3.

**Dec 17, 2014 Wednesday** **GSN CHRISTMAS MEETING, SILENT AUCTION & RAFFLE!**  
We have moved this dinner meeting and GSN Foundation fund-raiser to the J.A. Nugget this year! We will have a lot more space and will be able to seat more people for dinner. Guest speaker is George Davis, Univ. of Arizona – on *The Beauty of the Geology of the Colorado Plateau*. Cost for dinner—\$35. Details on page 11.



**G.S.N. NOVEMBER MEETING SPONSOR**

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**FROM THE PRESIDENT, NOVEMBER 2014**  
***It's Not Just Gold!***  
**Jon Price, G.S.N. President 2014-2015**

This month's talk by Steve Peters will be about his USGS work in Afghanistan, particularly the Khanneshin carbonatite. Carbonatites are some of the most interesting igneous rocks, in large part because they are hosts for the world's leading deposits of light rare earth elements (LREEs), niobium, and tantalum. In June of 2010 Steve sent me this picture of his doing Afghan field work with armed guards – another reason why Nevada is a great place to explore.



The global search for LREEs and heavy rare earth elements (HREEs), critical elements for many industrial and defense applications, has been stimulated by China's near monopolies on mining of both LREEs and HREEs (91% in 2013) and the related value-added industry of high-strength magnet fabrication. Iron-neodymium-boron ( $\text{Fe}_{14}\text{Nd}_2\text{B}$ ) magnets are preferred in many applications, including computers and turbines for wind farms. (They are also ideal for detecting small amounts of magnetite and pyrrhotite in rocks.) With 19% of the world's population, we expect China to be a major producer of many mineral commodities, but as the graph illustrates, China produces well over 19% of several key resources. (Continued on page 13.)

***Thanks to RUEN DRILLING  
For Hosting the GSN's OCTOBER 17th MEETING!***

# GSN NOVEMBER 21, 2014 Membership Meeting

## Reservations Are Required - Please Cancel if You Are Unable to Attend

Please call 775-323-3500 or e-mail [gsn@gsnv.org](mailto:gsn@gsnv.org) by 4 p.m. on WEDNESDAY, NOV. 19, 2014.

Social Hour: 6:00 pm – Dinner: 7:00 pm – Speaker: 8:00 pm

**\$25.00 per person.** Location: Reno Elks Lodge, 597 Kumle Lane, Reno, Nevada

Directions: across (W) from the Reno-Sparks Convention Center (S. Virginia Street, behind the Les Schwab Tire Center)

### **Results of Three Recent Missions to the REE-, U-, F-, and P-bearing Khanneshin Carbonatite in Southern Helmand Province, Afghanistan Presented at November GSN Meeting by Stephen G. Peters, USGS, Reno**

#### **ABSTRACT:**

Three missions were undertaken by personnel from the U.S. Geologic Survey and the Task Force for Business and Stability Operations (TFBSO) of the Department of Defense to the Khanneshin Carbonatite in Southern Helmand Province, Afghanistan between 2009 and 2011 (Fig. 1). The three visits confirmed the presence of carbonatite rocks and, along with new aeromagnetic and hyperspectral data, also confirmed an earlier USGS estimation of an undiscovered probabilistic resource of 251 Million tonnes of ore containing 6.2 Million tonnes of phosphorus, and 1.4 Million tonnes of REE, with probable additional undiscovered resources of uranium, phosphorous, and fluorite (Fig. 1).

The first (2009) mission visited a site in the southwest part of the Khanneshin volcano with the assistance of the USMC. The second (2010) and third (2011) visits were conducted in the central part of the volcano utilizing Special Forces and private security (Fig. 2). These three modern visits confirmed the geologic setting described by previous Soviet and Afghanistan workers, and therefore the potential of significant REE, U, and P resources described by earlier workers was also corroborated.

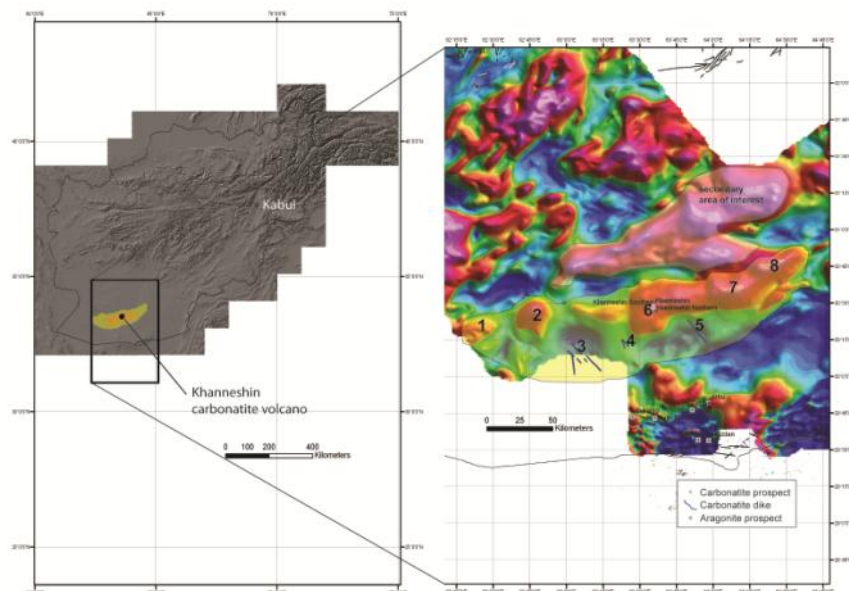


Figure 1. Map showing permissive and probable tracts in the Helmand Basin and the eight possible areas where additional carbonatite centers might be present within the tract, based on aeromagnetic data from Sweeney and others (2006). These targets form the basis of a quantitative estimate. Khanneshin carbonatite is number 6. (Continued on page 16.)

# “FACES OF GSN”

## Steve Craig

Becoming a geologist has been an incredible journey of friendships, adventure, and challenges. The truly pivotal event in my life as a geologist was being involved with GSN. I look back and recall my first field trip was in 1981, which was on an old Frontier bus that could not make it up the first steep grade on Lucky Boy Pass on its way to Borealis as mining was just starting up. I recall the first GSN meeting I attended was in about 1984 at the old Holiday Inn where the Atlantis now stands. I did not know anybody at the time, just walked around with a beer and smiled. Later on I had the privilege of making friends with nearly everyone in Nevada by attending the meetings and helping with the 1990 and 1995 Symposiums as field trip chairman and as VP and President in 1991 to 1993. Somewhere along the way, I made a few presentations at the monthly meetings; the most memorable included paying tribute to Vic Kral during a Mineral Ridge talk.

So how did it all start? I guess I had no choice in becoming geologist as I was the first son of a Dad who was a miner and adventurer. In his early life before the War, he tried fishing in Alaska, but decided after being ship wrecked near Kodiak that he would try mining. He was a tramp miner and had worked at Bisbee AZ, Empire Mine at Grass Valley CA, and finally at Bishop CA. When the War started, he immediately joined the Navy, became a torpedo man serving in a submarine in the waters north of Australia, and when in Sydney, he met my mom. She was a farm girl trying to escape the hard life. After the war, they married, and I was born in Cooktown, Queensland by a drunken doctor. They soon settled and homesteaded a plot of land in the tropical rain forest on the Atherton tableland above Cairns. Mom was terrified that a big python would gobble me up like the chickens they had, and dad got chased by wild pigs, one tearing a hole in his pants as he climbed a tree after his gun jammed. He made his living by hunting for cassiterite and crocodiles. After that, we moved to Mt Isa and lived in a tent for at least a year while he worked as an underground miner. (You can't make this up!)

Long distance trips in those days were done by DC-3 prop planes or on old troop carrier ships. In 1953 Dad brought his family across the Pacific with stops in New Zealand, Fiji, Hawaii and Vancouver. Visiting these places many years later déjà-vu comes into play. We traveled to Denver by car. He found a job at Climax and we moved to Leadville. I was raised in a house built before 1880 down the street from some old mine dumps. (Do you see where this is going?)

I finally graduated from high school in 1965, went to Colorado State and tried civil engineering, didn't like it, quit, then got a job at Climax shoveling spillage in the crusher and mill. Viet Nam was happening and I joined the Air Force, ending up in Washington DC for three years. After discharge, I used my veteran's benefits enrolling in the Geology program at Western State College (affectionately called Wasted State for the skiing and parties) in Gunnison under Doctors Fred Menzer and Bruce Bartleson.

Working for a Big Mining Company. I graduated in 1974 when the industry was in a downturn, but I got my first summer job in Washington State for Bear Creek Mining Company doing rig sitting and stream sampling. I learned to chase black bears up pine trees for amusement (except one that chased me). I spent two summers in Washington State, the second in the southern Cascades around Mt. St. Helens before it erupted. After the summer job, I went to the Questa Mine in a joint venture with Molycorp. I was exposed to every level of exploration and mining. It was during this time I became a volcanic and moly porphyry scientist and could have qualified for a PhD with the work I did. I then decided being a geologist was something I wanted to do forever. I was so enthusiastic that I decided to go to Colorado State to study under Dr. Tommy Thompson for a Master's degree. I specialized in ore deposits, and found that after Questa, classes were easy. I conducted moly exploration in the summers and completed my thesis over the Turquoise Lake moly system near Leadville. Life was good.

After a trip to Australia to see relatives and then New Zealand to see the fjords and the champagne pool, I graduated with my Masters in 1980. My new career after school continued with Kennecott. The search program was interesting with exploration moving to gold in the San Juans of Colorado. Jon Gant was my partner, and we did crazy things like drilling a core hole at 13,500 feet off Cinnamon Pass. My two younger brothers saw me driving around in a company truck, kayak on the roof, skis in the back, hiking every day and getting paid for it. They figured it out because they became geologists too, and both are successful in Nevada today. While living in Salt Lake City, I was sent to Papua New Guinea to be the first US geologist to conduct an initial evaluation on what would become the 40 million ounce Lihir gold deposit. I came back with malaria and was very sick. The next year was a trip to the Aleutians flying around the volcanoes out of Dutch Harbor. I could see full scale calderas and volcanic cones everywhere, and it made an impression on me.

Nevada started heating up for gold, so we took the invitation from Steve Potter to move to Reno in 1986. After about a year, I was running the small office on Kietzke Lane. Kennecott's philosophy back then was to look for something as big as Bingham without drilling any holes. Our mentor at the time was Frank Joklik, CEO of Kennecott, and our mantra was "tons for Frank". Our first discovery was Sandman, which Frank visited and deemed it too small. It took years of effort in budget meetings, but we finally started to get some drilling money after discovering the Mary Harrison deposit under Highway 49. Soon after, my exploration group started making more discoveries under pavement, which included Gemfield, Midway, and Castle. We woulda, coulda, shoulda got the Spring Valley discovery, but our fourth and last hole intercepted the only blank area in the near surface deposit (Midway Gold finally found it!). (Cont. pg 5)

(Steve Craig, Cont. from pg. 4)

A couple of other resource projects we worked on included Briggs, Golden Arrow and Cahuilla. We also conducted a massive sulfide search in California with some success, and we completed a diamond/colored gemstone program in California and Utah (Ruby Violet beryls) with significant success. People that made things happen in the field at the time were Steve Jones, Carl Hehnke, Tom Callibrate, Toby Mancuso and Will Rohtert, along with many others on the team.

These were heady years because major new discoveries were underway in Nevada. I represented Kennecott at Cortez during their big discoveries and helped to get Rawhide moving again with more development drilling. During this time, the group drilled probably 120 different projects with mineralization intercepted in most. We also developed a new pediment-focused geophysical/structural approach to exploration, which returned mixed results. It was also during this period that Kennecott gave me strong support for volunteer work in GSN and NWMA. Both organizations taught me a lot, and I gave them a lot. Well worth the time.

The Kennecott Exploration group in 1988 at the McLaughlin gold mine.



Front row, Joe Haskell, Tom Gibson, Toby Mancuso, Sandy Moyle, Dave Watkins, Steve Craig, Jay Hammitt, Bill Spence, Kevin McAndrews (RIP), Ken Gillen, George Green, Joel Padgett, Jim Myers, Jon Gant, Rob Taylor. Second Row: Tony Taylor, Joe Moye, Pam Klessig, Carl Hehnke, Phil Fikkan, Dave Simpson, Tom Young (Icky beer), Eric Stimson, Doug Bowden, Brian Wakeman, Mike Senn, Doug Duskin (RIP), Linus Keating, John Churchill. Third row: Russ Babcock, Al Glaser, Walt Meyers, Chris Benson, Rich Laveille, Leslie Hepler.

A History of Changes with Kennecott. I worked for Kennecott Corporation beginning with Bear Creek for a total of 23 years. During that period the company was taken over by Sohio, British Petroleum, RTZ and Rio Tinto. It also took over the Amselco exploration group and US Borax. My stay with Kennecott ended in 1997 when Rio Tinto no longer wanted to explore for gold in Nevada. I had to lay off most of my staff, and then when I saw the sights on me, I resigned. What I found interesting was that the people who worked with me and in other offices, eventually many of them became Presidents or Vice Presidents of other companies. Kennecott was a remarkable time and a fantastic training ground. (Cont. on page 6)

(Steve Craig, Cont. from pg. 5)

Moving to the Junior Companies. Leaving Kennecott was a life changing event. Large companies give you security and consistency. Junior companies are the opposite. During the next 17 years up to the end of 2013, I worked with four junior companies as Vice President of Exploration and sometimes Director. I found that there is no cash tree in juniors; when you run out of money, you don't get paid and creditors hound you. The stress a person feels in raising money from interested investors is huge. When successful, you get some more time, when not, all hell breaks loose. It always ends though.

My first junior was with Romarco chasing international opportunities. This lasted about 6 months and ended because the BRE-X scandal hit and the markets collapsed. My partner in this short effort was Pam Klessig. My big trips were to northern Brazil, northern Peru, and central Mexico. I got into some strange situations where I walked into mine tunnels full of pot near Mazatlan, flew over the rainforest in a Cessna held together with duct tape in Brazil, and feared that the Shining Path terrorists might kidnap me in Peru.

The junior that transitioned me into understanding how junior companies worked, in general, was Golden Phoenix Minerals. This lasted about 8 years and it provided more adventure, success and failure than any sane person would ever want. Early on the company was involved with Alaska and with numerous projects in Nevada and California. Arriving in Fairbanks at midnight in January at 40 below is a humbling experience. Alaska in the summer from a helicopter is the way to go.

The company "died" the first time in about 1998 by running out of money, again a lot of it due to BRE-X. Everybody quit except me and Mike Fitzsimmonds; we both had a vision of bigger things for the company. I recall receiving no pay check for 18 months, which meant I wiped out my savings paying the monthly home bills. Gold price dropped to \$325 an ounce. It was tough times for everyone.

In about 2000, we went to a bankruptcy judge and bought the Mineral Ridge Mine for about \$250,000. Along the way we had gotten control of the Borealis mine and the Contact copper project. I spent a lot of quality field time understanding the deposits and chipping a lot of rocks. We finally put the Mineral Ridge Mine into "production" and failed due to a number of obvious issues. (It is good to see Scorpio do the project correctly and see their success). I was approached to look at the Ashdown moly deposit and found it intriguing. We picked it up, and while Mineral Ridge was going down, the moly price was moving toward \$45 per pound. Ashdown became more attractive and we got investors to build a mill and open the old tunnels into the deposit. Production was short lived due to difficult mining and collapsing moly prices. During this time, Contact languished, but I spent a lot of time finding copper everywhere and developing a new deposit model. I was pleased to see that International Enexo took it to a feasibility study after they spent millions on drilling.

In 2005, Golden Phoenix was sinking into the ashes again. I arranged a sale of the company's remaining 30% interest in the Borealis joint venture with Gryphon Gold. We sold it for \$1 per ounce or at the time \$1,400,000. This basically allowed the company to flop around a little longer (see Dave Caldwell's story). Things were getting strange in the company, and so I terminated without a place to go.

Gryphon Gold offered me a job at Borealis later in 2005, and I moved to Lakewood for a year. Life became good, but the next six years the company went through a long volatile period. It tried to move to mine development but a resource bust stopped it. It then did a lot of drilling and expanded the Graben resource. The market collapsed, the company ran out of money, and I was laid off, but continued to consult to them. After about a year and half, things started looking up, so I took a second run with the company, which was moving toward mine construction. However, by 2011 things were getting really weird in the company, and out of the blue I got a job offer from El Tigre Silver.

I spent the next two years with that company going to their project in Sonora Mexico via Hermosillo. It was an exciting but difficult project (the stories I can tell). I ended my stay after drilling out a small silver-gold resource and proving up their tailings project, and then the company ran out of money. Hasta la vista, baby.

Current Goals. After a total of 40 years experiencing large and small companies, I decided I needed to change my career goals. With the help of Paul Dockweiler, a geologist I hired at Mineral Ridge, I am now with **Cardno**, a consulting company in Reno that is focused on getting a strong presence in exploration mining in the western US. I am finding that a lot of people don't know anything about Cardno. The company currently has about 85 offices in the US and over 8000 employees. Cardno conducts a broad range of services to the mining industry. My job is both business development and technical when a client needs geological service. I am having fun again.

My personal goal is to remain active in the industry, and at 67, not go into "retirement". I continue to enjoy doing geology and knowing all the interesting people in the industry, both inside and out of GSN. At home, I live with my wife Margie along with 9 alpacas, one llama, two dogs and a cat. Now, instead of skiing off cliffs and plunging down class 5 rapids in a kayak, I spend my off time gardening, caring for the herd, and traveling to new places on Google Earth. I am still looking for that perfect place, and being a geologist, the search is more fun than finding it. (Cont. on page 7).



My two best friends, all in white

Other things that I have learned. I have learned a few other things that may be of interest to our friends, and especially to our younger professionals for consideration:

I was once told that I was the luckiest person in the world because I worked with people (geologists and engineers) that were educated and driven to succeed. Always look around and enjoy your professional experience, we are the luckiest people in the world. I commonly say that I like what I do so much that I have never "worked" a day of my life.

My number one guide to life and how I approach my job includes three things: I have to like the company, like the people and like the project. If any one of these stops, it is time to leave.

Drive fast (but carefully), take chances, have fun, and find a big gold deposit. This refers to an exploration geologist's personality and outlook on life as discovery is a big gamble. If you don't gamble there is no discovery. A friend put it another way; "no risk it, no biscuit."

In management, let your people do their job. After all, you hired them. Guide them. Reap the rewards. They make you look good.

Always be honest, ethical and accomplish your goals, you sleep better at night.

Be prepared and be on time. Be able to step off a drill rig and give a board room presentation in a tall building the next day.

Be wary of people with hidden agendas, or who lies to you, or betrays you or claims to be competent. They can destroy you. They are everywhere. Shrug it off and go on.

It's now time for a beer and then go exploring!! Cheers!

## *Thank you to our generous donors in October!*

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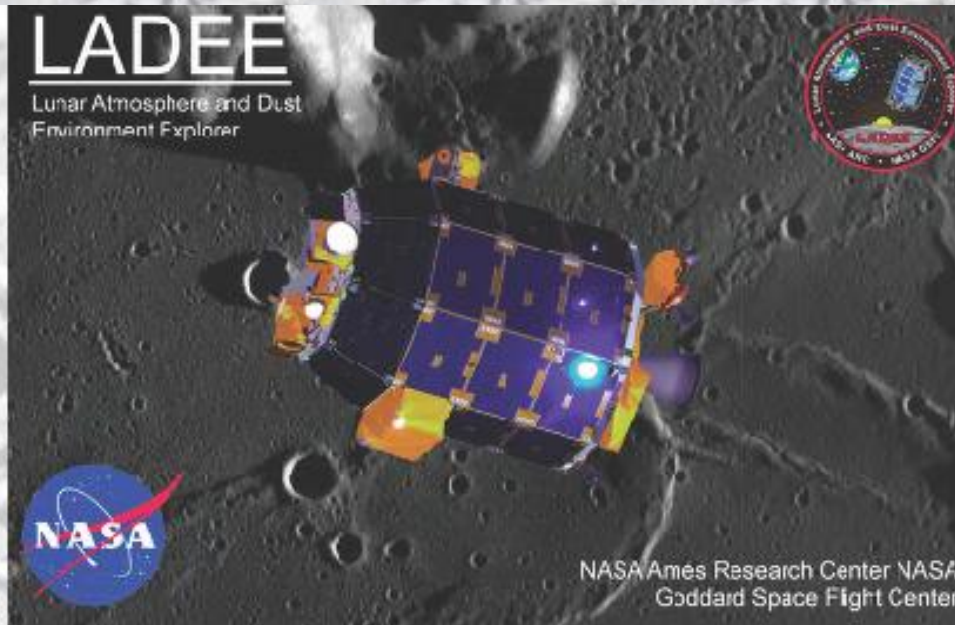
# Geological Society of Nevada



## Southern Nevada Chapter Meeting

**DON'T MISS OUR NEXT MEETING !!**

GSN is proud to present a talk by Dr. James H. Bell of the  
NASA-Ames Research Center, Mountain View, CA  
"The Lunar Atmosphere and Dust Environment Explorer:  
The Mission and Preliminary Results"



### ABSTRACT:

The Lunar Atmosphere and Dust Environment Explorer (LADEE) was a NASA mission launched in September 2013 to study the Moon's tenuous gas and dust atmosphere, and to demonstrate a prototype laser communications system. During its seven month mission, LADEE made new discoveries about the dynamics of the thin gas and dust envelope which surrounds the Moon, helping to resolve mysteries which had been remained unexplained since the Apollo missions. This talk describes the LADEE mission and presents some of the preliminary data released by mission scientists so far. This talk will also describe how planetary scientists interact with the NASA missions which fly their instruments, and the challenges and frustrations planetary scientists can face when working on a NASA mission.

The Meeting will be **November 6th at 5:30pm** at the  
Las Vegas Natural History Museum (900 Las Vegas Blvd N.)

**FOOD AND REFRESHMENTS PROVIDED BY SCHLUMBERGER!!**

**ALL ARE WELCOME!**

For more information contact Josh Bonde (Joshua.Bonde@unlv.edu)



# GSN ELKO & WINNEMUCCA CHAPTER 4th ANNUAL JOINT MEETING

**THURSDAY, NOVEMBER 20, 2014**

**Location: The BATTLE MOUNTAIN CIVIC CENTER, BATTLE MOUNTAIN, NV**

**Time: 6:30 p.m. Appetizers/Drinks**

**7:30 p.m.—Talk begins**

**SPECIAL GUEST SPEAKER: HARRY E. COOK**

**(See Title, Abstract and Biography below)**

**Food and Drinks Sponsored by:**

**NEWMONT MINING CORP. & BARRICK GOLD EXPLORATION, INC.**



**NEED TRANSPORTATION TO THE ELKO-WINNEMUCCA CHAPTERS JOINT MEETING  
IN BATTLE MOUNTAIN, NEVADA ON THURSDAY, NOVEMBER 20th??**

**ELKO BUS WILL LEAVE THE RALEY'S PARKING LOT promptly at 5:40 P.M.**

**WINNEMUCCA BUS WILL LEAVE THE WALMART PARKING LOT (near the back) promptly at 6:00 P.M.**

Contact **Emily Sudholt** for Winnemucca to Battle Mountain bus— [esudholt@klondexmines.com](mailto:esudholt@klondexmines.com)

Contact **Jon Powell** for the Elko to Battle Mountain bus— [jon.powell@newmont.com](mailto:jon.powell@newmont.com)

**Email them now so you will for sure have a seat on the bus!!**

**Discard the Name Comus Formation—New Predictive Carlin-Type Gold-Host Models for the Getchell Trend:**

**Will the Real Cambrian–Ordovician Comus Formation Please Stand Up and Reveal Your True Birth Places?**

**By Harry E. Cook**

*Carbonate Geology LLC, 640 Marlin Court, Redwood City, CA 94065 USA*

## **ABSTRACT:**

New Carlin-Type Gold Host models document the Comus Fm. strata along the Getchell Trend were derived from both a Late Proterozoic–Early Paleozoic siliciclastic continental margin to the west and a Cambrian–Ordovician carbonate seamount to the east. The reason that the name Comus Fm. is historically very confusing is that the Comus Formation is comprised of five different interfingering facies: (1) gray allochthonous carbonates, (2) brownish allochthonous siliciclastics, (3) greenish allochthonous volcanogenics, (4) black pillow basalts and (5) white barite\*.

The Comus Formation gray carbonate debris flows, turbidite fans, slumps, slides and fine-grained carbonate ooze were transported westward from the Comus Carbonate Seamount platform margin during multiple eustatic sea level lowering events. Brownish siliciclastic debris flows, turbidites, slumps, slides and fine-grained muds were transported eastward from a coeval subaerial siliciclastic continental shelf and adjacent marine slope and multiple submarine fan systems along the entire Getchell Trend. Submarine volcanoes along the Getchell Trend account for the greenish volcanogenic debris flows, turbidites and pillow basalts. White bedded barite “smokers” probably (Continued on pg. 10)

(Cook Abstract, continued from page 9)

emanated upward through seafloor hydrothermal vents and faults and account for barite within the Comus Formation. This sedimentologic mélange has led to numerous multifaceted, stratigraphic and structural interpretations that are sometimes not within reasonable “Geologic Fences”. As a result Carlin-Type Gold-Host models have not always been complete or accurate. This has adversely affected exploration strategies and results.

In 2007–2010 this author studied the Type Section of the Comus Formation at Iron Point as defined by Ferguson et al (1951). In this author’s opinion the Type Section Comus Formation consists of interbedded Ordovician Hanson Creek, Valmy and perhaps Silurian Roberts Mountains strata (Cook, 2010, unpublished).

Of further advancement toward resolving the confusing name *Comus Fm.* is that the Type Section of the *Preble Formation* at Emigrant Canyon (Ferguson et al, 1951; Madden-McGuire, 1991) is comprised of all five facies (1–5) described above for the so-called “*Comus Formation*” (Cook, 2013 unpublished). Thus, based on the well exposed strata along Emigrant Canyon this author re-interpreted the stratigraphy and sedimentology of the strata at Turquoise Ridge, Twin Creeks, Burma Road outcrops in the Osgood Mountains, Pinson, and other outcrops and cores north of Turquoise Ridge and Twin Creeks in the Snowstorm Exploration area. These new interpretations document that the Comus Formation is confusing because, depending on where you examine the Comus Formation along the Getchell Trend, it is comprised of varying amounts of the five different facies. At some locations only two of the five facies are present.

Thus, this author proposes the name “*Comus Formation*” be abandoned and that the name *Preble Formation* be named for the former *Comus Formation* strata. Further, it is proposed that the Type Section for the redefined *Preble Formation* be established at the well-exposed easterly dipping Emigrant Canyon *Preble Formation* Type Section. Here a complete stratigraphic section illustrates facies 1–5\* described above. Also, this author proposes that the newly described *Preble Formation* be divided into four members (Cook, 2014 in preparation). Roughly, from the base up Member 1 represents basinal siliciclastic and carbonate turbidites; Member 2 represents siliciclastic and carbonate base-of-slope debris flows and turbidites; Member 3 represents middle slope carbonate slumps and slides and lesser amounts of siliciclastics; and Member 4 represents upper slope carbonates. Overlying these four members is the Valmy Formation comprised of greenish submarine volcanoclastic debris flows, subaerial-derived volcanic ash, pillow basalts, siliciclastic slides, slumps and debris flows. The Valmy subaerial ash effectively smothered the shallow water Comus Carbonate Seamount’s carbonate producing biota. This resulted in the demise of the Comus Carbonate Seamount and accordingly the cessation of carbonate slides, slumps, debris flows and turbidites which heretofore comprised the best Carlin-Type Gold Hosts.

With a newly defined *Preble formation* and its four members and an understanding of its complete genetic Stratigraphic Bar Code, predictive gold-host models and trends will be less confusing and can be more accurately understood and explored along the Getchell Trend.

#### **BIOGRAPHY–2014**

##### **Harry E. Cook, Ph.D., CPG-11001, USGS Emeritus (GS-17)**

President and CEO of *Carbonate Geology LLC*. *Carbonate Geology LLC* is an international consulting company specializing in locating and developing predictive gold-host models and gold trends for Carlin Type Gold-Hosts (CTGH) in carbonate reefs, platforms, slopes, basins and carbonate seamounts. As a Senior Research Geologist with the USGS he conducted surface and sub-surface studies on carbonate reef, platform, slope and basin rocks worldwide in the USA (lower 48, Alaska), Alberta, Yukon Territory, Northwest Territories, Mexico, Africa, Western and Eastern Europe and the Former USSR (Russia, Siberia, Kazakhstan and Kyrgyzstan), Equatorial Pacific, Baja CA, Florida and Tahiti.

Harry consults, leads field seminars and gives carbonate geology short courses for gold companies such as Barrick, Newmont, Pilot, U. S. Gold, Evolving Gold, Timberline, Miranda, Snowstorm, ATAC, Kaminak, Anthill, Venture One, Desert Star, Tarsis and Carlin Gold. These studies have been conducted along major gold trends in Nevada and Utah, including Carlin, Rain, Bald Mountain, Alligator Ridge, Archimedes, Ruby Hill, Getchell (Turquoise Ridge/Twin Creeks), Cortez, Tonkin Springs, Roberts Mountains, Eureka, Independence, Limousine, Long Canyon and Kinsley Mountain. In Canada he conducted surface and sub-surface studies in the northern Yukon Territory, along the Yukon Territory’s ATAC Rackla Trend and developed the carbonate platform Einerson Lake Trend for Anthill Resources. In the Northwest Territory he developed a Cambrian–Mississippian carbonate stratigraphic column for Kaminak including multiple, carbonate debris flow and karst Carlin Type Gold-Hosts.

He was a Professor of Geology at the University of California, Riverside and a Research Geologist at Marathon Oil Co.’s Denver Research Center in Littleton, Colorado.

Author of 100+ research papers, books and professional talks on carbonate geology, gold and other minerals, petroleum resources and carbonate sequence stratigraphy. He is a member of several geological societies, past President of the International SEPM Society of Sedimentary Geology and an American Association of Petroleum Geologists Distinguished Lecturer. Harry obtained his Ph.D. from the University of California, Berkeley and his BA from the University of California, Santa Barbara.

**DONATIONS NEEDED FOR THE GSN FOUNDATION ROCK RAFFLE & AUCTION!!**

**G.S.N.'S ANNUAL CHRISTMAS  
MEETING, ROCK RAFFLE & AUCTION  
WEDNESDAY, DECEMBER 17, 2014**

**J.A. NUGGET, SPARKS, NEVADA (note change of venue!!)**

**Dinner Cost - \$35.00/person**

**6 p.m. - Open Bar, Raffle & Silent Auction**

**7 p.m. - Dinner, 7:45 p.m. - Live Auction, 8 p.m. - Presentation**

**Sponsor for the Evening is:**



The Geological Society of Nevada Foundation's fundraiser "Rock Raffle and Silent Auction" will be held at the GSN's annual Christmas meeting on **WEDNESDAY, December 17, 2014**. We are seeking donations of any items suitable for the raffle or silent auction: gift baskets, attractive rock or mineral samples, gems or gemstones, jewelry, wine or other spirits, logo items, geological equipment, commemorative coins, GOLD, or any geology or mining-related items will be gratefully accepted.

Raffle proceeds support GSN Foundation's educational projects, which include grants to Nevada K-12 classes for transportation on earth science related field trips, scholarships to Nevada geology students, grants to the UNR DeLaMare Library, and grants for geologic mapping in Nevada.

Donors will have their names displayed on signs at the event as well as having their names listed in the January newsletter. The GSN Foundation is a 501(c)(3) public charity.

Please contact D.D. LaPointe to drop off donated items with her or to arrange pick-up of donated items in the Reno-Sparks-Carson City area. We need to have all items in hand by Monday, December 15, 2014. It would be great if you could let us know ASAP what you plan to donate in order to prepare labels and make bid sheets. Thank you for your support! D.D.'s cell number is 775-240-4916 and email is [dlapoint@unr.edu](mailto:dlapoint@unr.edu).

You can also drop off donations this year with Cami Prenn at Mine Development Associates, 210 So. Rock Blvd., Reno OR with JoAnn Newbury at NuLegacy Gold, 5450 Riggins Court, Suite 1B. Reno, NV. Call JoAnn in advance at 775-224-1717 as her office hours are sporadic. You can drop off donations with me at the GSN office too!

# Activity Update

Mike Brady, August 2014

[www.activityupdate.com](http://www.activityupdate.com)

## NEVADA

Navaho Gold Ltd. announced that it terminated its interest in the Utah Clipper Property of Columbus Gold Corp. *Press Release: September 18*

Freeport McMoRan Mineral Properties Inc. announced that it acquired an option to purchase the Southwest Tintic, Utah; Butte Valley, Nevada and the Cave Peak, Texas properties from Quaterra Resources Inc. for \$5,000,000 cash over 2 years. (resource @ Butte Valley = 181,800,000 tonnes @ 0.60% Cu inferred) *Press Release: September 11*

Gold Resources Corp. announced that it acquired an option to earn a 100% interest in the Radar Property from Altan Nevada Minerals Ltd. for \$1,500,000 cash. *Press Release: September 10*

West Kirkland Mining Inc. announced that recent drill results at the Three Hills Project include 161.54-174.26 meters @ 0.61 gpt Au, 4.0 gpt Ag (TH14R-02); 128.02-134.11 meters @ 0.48 gpt Au, 3.2 gpt Ag (TH14R-03); 172.21-222.5 meters @ 0.73 gpt Au, 3.2 gpt Ag (TH14R-04) and 179.83-185.93 meters @ 1.03 gpt Au, 5.0 gpt Ag (TH14R-05). (resource = 7,731,000 tonnes @ 0.61 gpt Au measured+indicated) *Press Release: September 9*

Scorpio Gold Corp.(70%) announced that recent drill results at the Mineral Ridge/Brodie Project include 0-3.05 meters @ 0.55 gpt Au (MR14850); 32.0-33.53 meters @ 1.06 gpt Au (MR14899); 76.2-83.82 meters @ 0.84 gpt Au (MR14941) and 68.58-70.1 meters @ 1.51 gpt Au (MR14957). *Press Release: September 16*

Rye Patch Gold Corp. announced that recent drill results at the Gold Ridge Project include 61-93 meters @ 0.15 gpt Au (GR-016); 56.4-76.2 meters @ 0.67 gpt Au (GR-017); 0-18.3 meters @ 0.23 gpt Au (GR-018) and 0-24.4 meters @ 0.24 gpt Au (GR-019). *Press Release: September 15*

Premier Gold Mines Ltd. announced that it completed the purchase of a 100% interest in the Cove-McCoy Property from Newmont Gold Corp. (resource @ Cove = 425,000 tonnes @ 10.46 gpt Au indicated) *Press Release: September 11*

Pilot Gold Inc.(78%) announced that recent drill results at the Kinsley Mountain Project include 411.5-437.4 meters @ 1.34 gpt Au (PK153); 255.1-273.4 meters @ 3.91 gpt Au (PK159C); 235.0-239.9 meters @ 6.81 gpt Au (PK162C) and 280.4-283.6 meters @ 1.10 gpt Au (PK166C). *Press Release: September 10*

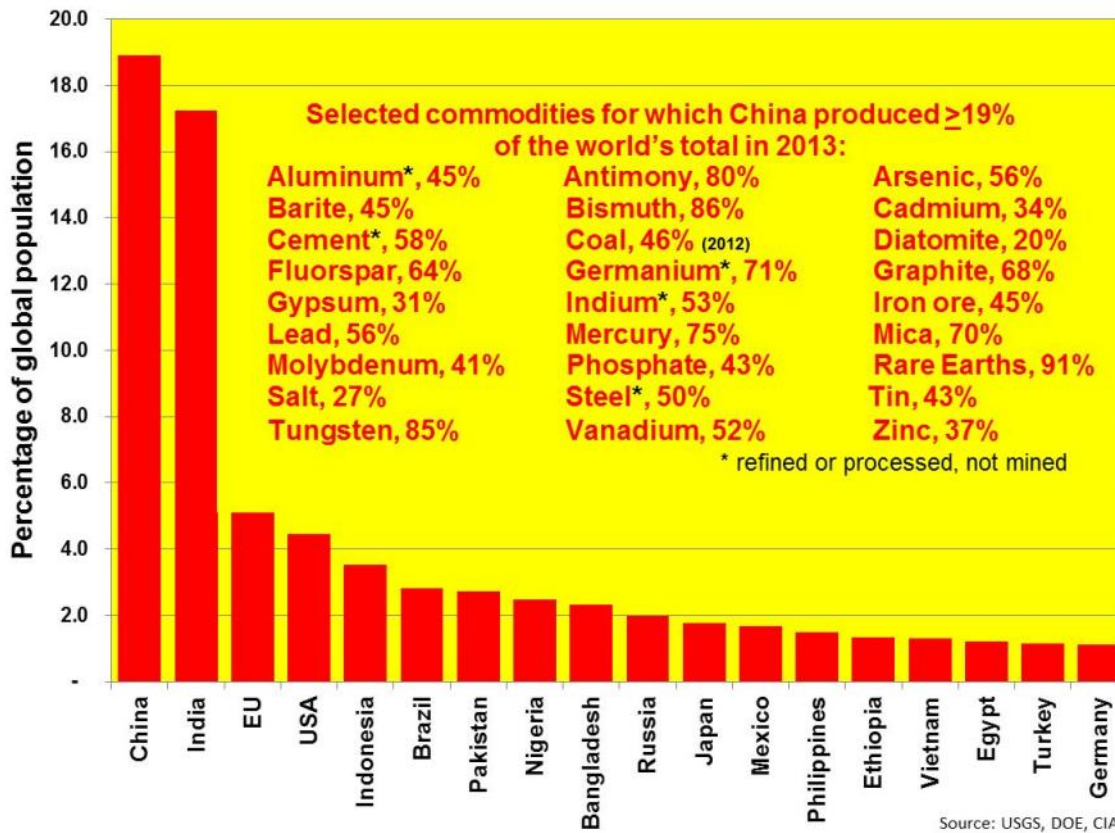
Pershing Gold Corp. announced that recent drill results at the Relief Canyon Project include 131.1-154.8 meters @ 1.26 gpt Au (RC14-160); 148.5-179.9 meters @ 3.56 gpt Au (RC14-177); 160.7-184.3 meters @ 1.88 gpt Au (RC14-179) and 119.5-159.6 meters @ 2.02 gpt Au (RC14-185). (oxide resource = 24,270,000 tonnes @ 0.68 gpt Au measured+indicated) *Press Release: September 15*

Veris Gold Corp. announced that it paid a fine of \$182,000 to the U.S. Environmental Protection Agency for failure to correctly report to regulators the release of toxic chemicals into the air and ground from the Jerritt Canyon Complex during 2007 and 2008. *Reno G/J: September 26*

Klondex Mines Ltd. announced that recent underground drill results at the Midas Mine include 0.4 meters @ 48 gpt Au, 11,251 gpt Ag (MUC-2502); 0.4 meters @ 99 gpt Au, 2,223 gpt Ag (MUC-2529); 0.8 meters @ 38 gpt Au, 1,778 gpt Ag (MUC-2532) and 0.7 meters @ 37 gpt Au, 68 gpt Ag (MUC-02554). (reserve = 545,000 tonnes @ 3.24 gpt Au, 266 gpt Ag proven+probable) *Press Release: September 10*

Gold Standard Ventures Corp. announced that based on recent drill results at the Pinion Project, resources aggregate 20,840,000 tonnes @ 0.63 gpt Au indicated and 55,930,000 tonnes @ 0.57 gpt Au inferred. (no previous estimate) *Press Release: September 10*

Corvus Gold Inc. announced that recent drill results at the North Bullfrog/Yellowjacket Project include 153.3-181.1 meters @ 1.0 gpt Au, 6.1 gpt Ag (NB14-387); 142.0-166.6 meters @ 2.8 gpt Au, 14.1 gpt Ag (NB14-389); 130.8-216.5 meters @ 0.3 gpt Au, 10.4 gpt Ag (NB14-390) and 211.8-221.1 meters @ 1.9 gpt Au, 11.5 gpt Ag (NB14-392). (resource @ Yellowjacket = 4,000,000 tonnes @ 0.97 gpt Au, 5.1 gpt Ag indicated) *Press Release: September 4*



The Mountain Pass, California carbonatite, a major source of LREEs, is back in production just west of the Nevada border, south of Las Vegas. Although no significant LREE-bearing carbonatites have been discovered in Nevada, there is potential here for HREEs, which tend to be associated with geochemically unusual rhyolites and granites. Interestingly, both carbonatites and HREE-rich rhyolites are enriched in thorium, which offers a handy radiometric exploration tool. Nevada's lithium deposits and Utah's major beryllium deposit are also associated with geochemically unusual rhyolites. In other words, there's more to find in Nevada than just gold.

Steve will be followed by other great speakers:

December 17 – George Davis, Univ. of Arizona – on *The Beauty of the Geology of the Colorado Plateau* (Wednesday evening at the Nugget in Sparks – guests will enjoy this talk, and we'll have the auction for the GSN Foundation!)

January 16 - Paul Hohbach, Coeur, on silver deposits in the western US

February 20 – Alan Koenig, USGS, Denver – Where the Trace Elements in Ore Deposits Live - Applications of a New Elemental Analysis Technique.

March 20 –UNR-Department of Geological Sciences and Engineering Faculty – A Sampling of Geoscience Research at UNR

April 17 – likely UNR student posters and 5-minute presentations (TBD)

May 14-24, GSN 2015 Symposium.

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**MAJOR**

Partners on the Ground

## GSN Fall 2014 Field Trip Wrap Up

By Elizabeth Zbinden

Of course we saw great geology! Also, this field trip was an opportunity for GSN members from the north and the south of the state to swap stories and get to know each other better.

We spent Saturday south of the city of Las Vegas. Our first stop was Castle Mountain Project, less than five miles (as the crow flies, but a lot farther over unmaintained road) into California. GSN last visited Castle Mountain Mine with the 1995 Symposium. Since then the mine shut down but the current exploration team led by our tour hosts Peter Olander and Kevin Kunkle is making rapid progress towards feasibility to re-open it. It is an oxidized low-sulfidation epithermal gold deposit associated with Tertiary volcanic rocks. At our first stop we viewed core from all the geologic units and at five subsequent stops we viewed the units in-place in walls of the historic pits. After Castle Mountain we visited the historic Duplex Mine; in 1897 it was the first discovery of the Searchlight District.

We spent Sunday northeast of the city on an adventure in paleontology and structural geology led by Josh Bonde. We drove the spectacular north shore of Lake Mead, where familiar Colorado Plateau stratigraphy meets Basin and Range structural scrambling. We continued in to the Valley of Fire State Park, the oldest and largest Nevada State Park. One hike took us to the location of the first dinosaur fossil discovery in Nevada. (It turns out that earlier-discovered Ichthyosaur, our beloved State Fossil, is not a true dinosaur despite the -osaur in the name.) On the same hike, we viewed fossil turtle shells, magnolia and sycamore leaves, and equisetum stems. We wrapped up the day walking where ancient critters walked, viewing fossil trackways.

**A huge Thank You! to sponsors and others who helped us out on the field trip: Boart Longyear and Peter Olander for dinner and social hour Friday; National EWP and American Assay Lab for dinner and social hour Saturday; Pershing Gold for lunches both days; New Frontier Drilling for snacks and drinks on the vans; Environmentalists and Cardno for van rentals; Castle Mountain Mining and the Colton family (Duplex Mine) for permission to visit their properties; Joe Laravie (Great Basin GIS) for guidebook figures.**



Group photo at Oro Belle Pit, Castle Mountain Project.



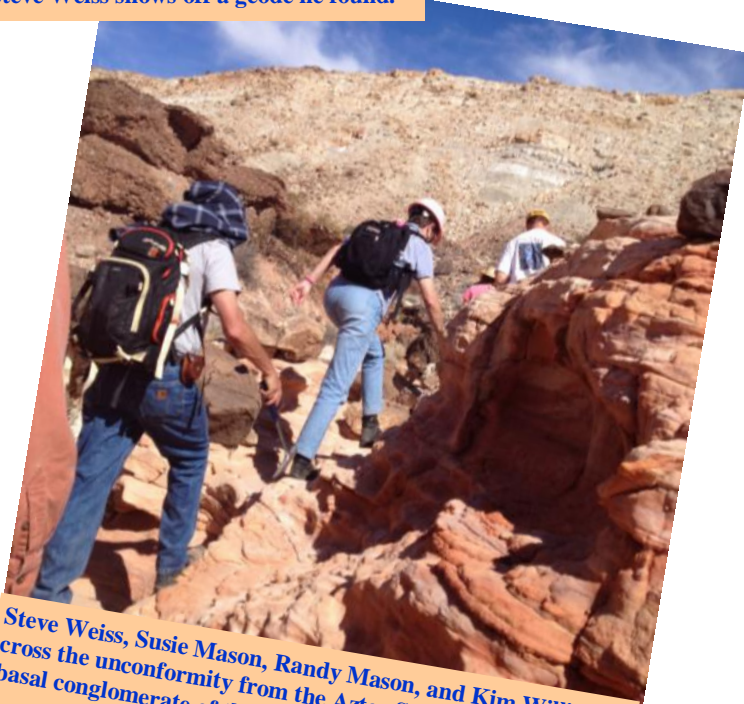
Steve Weiss shows off a geode he found.



Norma Biggar examines the beautifully-exposed contact between pyroclastic flow and rhyolite plug.



UNLV Student Jeremiah Smith shows what you can do with differential weathering in Aztec Sandstone.



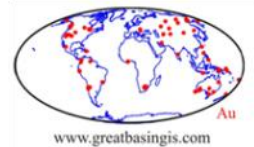
Steve Weiss, Susie Mason, Randy Mason, and Kim Williams cross the unconformity from the Aztec Sandstone up to the basal conglomerate of the Willow Tank Formation.



UNLV Student Jason Reek holds opalized magnolia leaf and equisetum stem.



PETER OLANDER



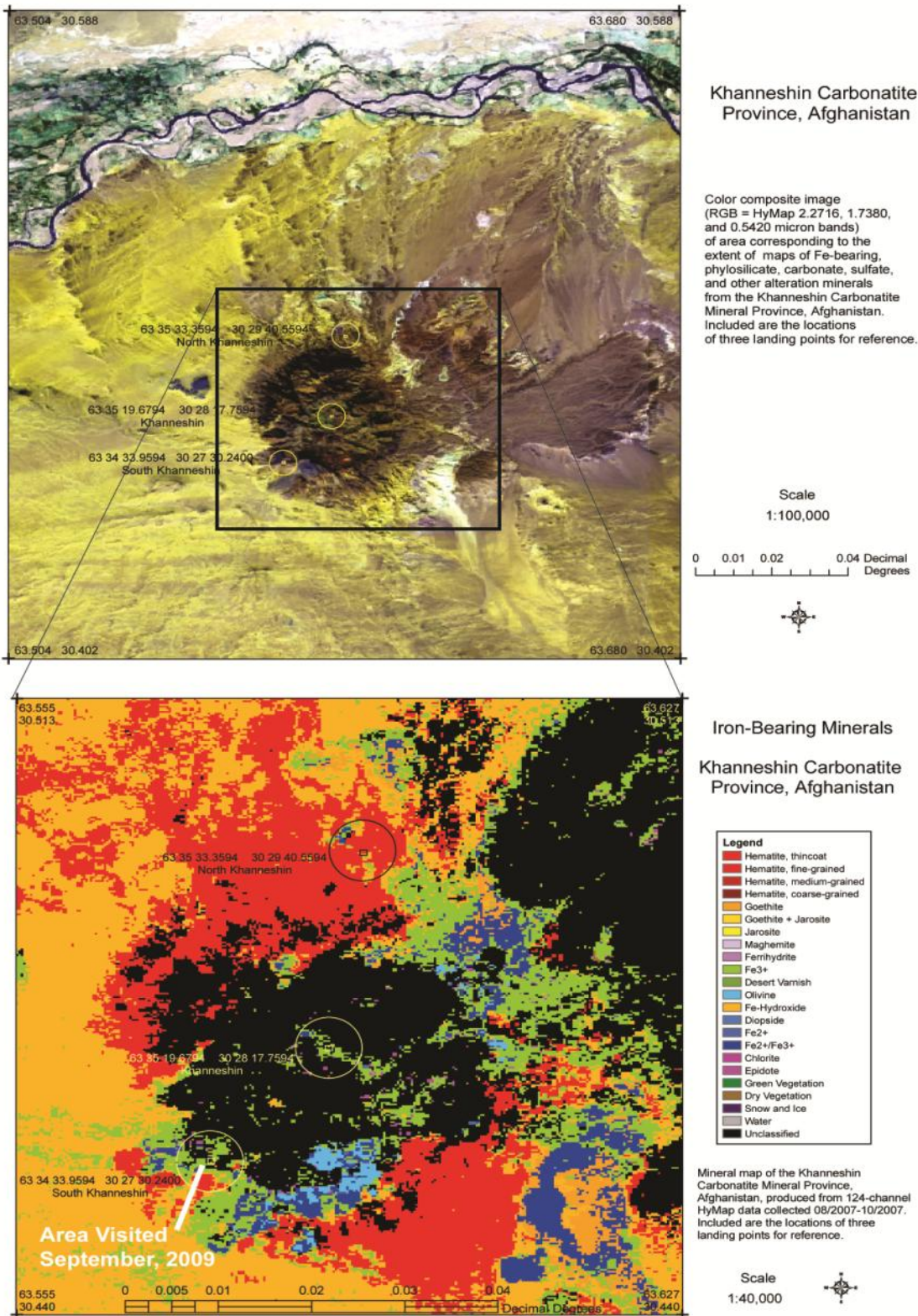


Figure 2. Images of the Khanneshin carbonatite complex. The top color composite image shows the volcano in relation to the Helmand River to the north and the three recorded mineral occurrence areas (circles). The bottom image shows the distribution of iron-bearing minerals from hyperspectral imagery. The southern zone was visited by the USGS in September, 2009. The central zone (white circle) was visited in missions 2 and 3 and is the site of the known REE mineralization. (Continued on page 17)



(Peters Abstract, continued from page 16.)

The rocks in the carbonatite complex have high concentrations of REE, uranium, strontium, fluorite, phosphorous, niobium, and lead. Uranium-thorium mineralization in the Khanneshin area is distributed over a 40 km<sup>2</sup> area. The Khanneshin uranium occurrence is a 2,000-m-long and 2- to up to 25-m-wide zone grading 0.006 to 0.015 wt. percent uranium and 0.002 to 0.010 wt. percent thorium.

REE concentrations are highest in the soevitic rocks and in ankerite-barite carbonatite. A central zone of REE mineralization was investigated in visits 2 and 3. Two types of LREE mineralization occur: (1). Epigenetic, cross cutting, 0.5–0.7 m thick and several tens of meters long, banded veins and seams with a vertical thickness of >150 m, and (2) syngenetic, semi-discordant fluorine- and phosphorous-rich dikes and sheets, as much as tens of meters wide and hundreds of meters long. Epigenetic veins and seams average 19.92 wt. % Ba, 3.61 wt. % Sr, and 2.78 wt. % total LREE. The syngenetic LREE-enriched discordant dikes average 11.1 wt. % Ba, 5.36 wt. % Sr, and 3.28 wt. % Total LREE. The values for Total LREE of fourteen average whole-rock samples range between 5.98 and 0.49 wt. %. The total LREE (La, Ce, Pr, and Nd) for eight average whole-rocks range from 6.23 to 1.83 wt. %. The carbonatite is homogenous for all isotope systems studies (Pb, Sr, and Nd) and there is no evidence of upper crustal contamination. The radiogenic isotope features of the carbonatite differ from other REE-mineralized systems.

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## BIOGRAPHY: Stephen G. Peters

### Résumé

Steve Peters is a Research Geologist with the US Geological Survey. His background is in mining and exploration geology and resource assessment. He is the Project Chief for the USGS Afghanistan Minerals Project and has also led projects in SE Asia and Madagascar. He received a Research PhD in Economic Geology from James Cook University of North Queensland, Townsville, Queensland, Australia, an MSc in Engineering Science Management from the University of Alaska, and a BSc in Geology from Northern Arizona University. Steve conducted field and laboratory research on Carlin-type Au deposits in Nevada and China for the USGS. Previous to this he worked in private industry for 20 years in the exploration and production of mineral deposits in Australia, Western U.S., Alaska, and South Africa, with various mining companies. Steve is a Registered Engineer (CEng) with the Institute of Mining and Metallurgy (London), a 32-year Member of the Society of Economic Geology (SEG), and a 40-year member of the Society for Mining, Metallurgy and Exploration (SME).



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Fax: 775-323-3599; or by mail to 2175 Raggio Pkwy., Reno, Nevada 89512

Thank you in advance for getting your dues in early (by November 30th)! Laura really appreciates it!

## GEOLOGICAL SOCIETY OF NEVADA

## 2015

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Offices are located at NBMG's Great Basin Science Sample & Records Library at The Desert Research Institute  
Walk-in Office hours: Tuesday through Friday, 8:00 AM - 3:00 PM. Mondays - Call or email for appointment.

The Geological Society of Nevada (GSN) is a non-profit, educational organization whose principal objective is to promote the advancement of geological sciences, especially as they relate to Nevada. GSN supports the dissemination of information through meetings, field trips, publications and academic endeavors. Membership is open to geologists, geophysicists, geochemists, engineers, educators, students, prospectors or anyone else with an interest in the geological sciences and/or the goals of the GSN. The organization is based in Reno with additional Chapters in Elko, Winnemucca and Southern Nevada.

The membership year begins on January 1. Annual dues of \$50.00 (\$25.00 for full time students) are due prior to December 31. The GSN conducts a Field Trip in the Fall and one in the Spring of each year. Monthly meetings are held September through May in Reno, Elko, Winnemucca and Las Vegas. If you would like to receive email announcements from Elko, Winnemucca or Las Vegas please check a box.

Please help support the GSN Foundation, the Student Dinner Fund, or Student Field Trip Fund when renewing. Foundation dollars are used for the Kindergarten through 12th grade Field Trip Earth Science Grant Program, Nevada Mapping Grants and University of Nevada and UNLV scholarships, and Field Camp Grants.

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Yes  No

**Optional Chapter Affiliation** (to be eligible for chapter voting and emails from those Chapter Officers)

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(Foundation Donated Funds will be used for unrestricted grants and scholarships unless otherwise specified below)  I wish to donate to the **GSN Student Field Trip Fund** \_\_\_\_\_

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# ROCK TALK



## **NBMG graduate students take clean sweep in GSA student map competition!!!**



Congratulations are in order for three of the **Nevada Bureau of Mines & Geology's** current and recent graduate students who won "gold, silver, and bronze" (clean sweep) in the **2014 Student Geologic Map Competition** at the annual meeting of the Geological Society of America in Vancouver, BC, on October 21, 2014.

**Chad Carlson** took **1st place** for his **Geologic Map of the Terrill Mountains, western Nevada**. Ph.D. student (Advisor-Jim Faulds).

**Russell DiFiori** took **2nd place** for his **Geologic Map of the Eureka Mining District, eastern Nevada**. M.S. completed-May 2014 (Advisor-Sean Long).

**Joel Edwards** took **3rd place** for his **Geologic Map of Neal Hot Springs, eastern Oregon**. M.S. completed-May 2013 (Advisor-Jim Faulds).award

All three worked incredibly hard and dedicated many months to generating some very detailed and beautiful maps of some very complex geology. These maps will stand as enormous contributions for many years to come. Please join me in congratulating three very talented individuals.

The NBMG's Cartographic/GIS staff also deserve kudos for helping with the layout and providing technical assistance on the maps. Nick Hinz also helped on many facets of the maps.

Jim Faulds, Director/State Geologist/Professor  
Nevada Bureau of Mines and Geology, U.N.R.



## **"Nevada residents to decide fate of mining tax"**

**By Andrew Topf, October 12, 2014**  
**Reprinted from Mining.Com online**

The Nevada gold-mining industry is keeping its ear carefully tuned to what residents think of the state's mining tax.

In November Nevada residents will be asked to vote on whether to remove a mining-tax cap from the Nevada constitution, which stipulates that the mining industry will pay no more than 5 percent tax on the net proceeds of minerals. If voters reject the 5 percent provision, the state legislature could impose whatever tax rate it pleases. Proponents of the ballot measure say the industry has a sweetheart deal that keeps the industry from paying its fair share. Opponents say removing the cap will open the door to increased taxes, which could discourage investment and kill jobs. The latter group feels that now is an especially bad time to be imposing more costs on the industry, when the gold price is in a slump.

Barrick Gold (NYSE:ABX, TSX:ABX) and Newmont Mining (NYSE:NEM), the two companies that dominate gold-mining in Nevada, have the most to gain or lose from the outcome of the vote, which takes place on Nov. 4.

The resolution was first proposed in 2011 when the gold price was approaching \$1,800 ounce. It has since slipped to \$1,223/oz, as of Friday. The thinking back then was that increasing the mining tax would help to alleviate a \$2-billion shortfall in Nevada's budget as a result of the recession.

According to the Nevada Mining Association, the net proceeds of minerals tax brought in \$159.4 million in 2013, with about 96 percent coming from gold and silver. That same year, Nevada produced 5.4 million ounces of gold, at an average price of \$1,200 an ounce, the association states – an amount equivalent to about 75 percent of all the gold produced in the United States.



## **25TH ANNUAL AIPG EXPLORATION ROUNDUP TO BE HELD DECEMBER 11, 2014!**

The 25th AIPG Exploration Roundup will be held on Thursday, December 11, 2014 at the Ramada Inn, 14<sup>th</sup> floor Skyroom, 6<sup>th</sup> and Wells, Reno, Nevada. Cocktail hour is at 6:00 PM, dinner at 7:00 PM and the program begins at 8:00PM. Eight speakers are expected.

Boart Longyear is the bar sponsor and also a student sponsor. Global Hydrologic Services is providing the mineral specimens for UNR student raffle. Reservations made prior to December 9<sup>th</sup>, \$50.00, after December 9<sup>th</sup> \$60.00. Cash or checks only please.

Reservations: Kel Buchanan, [summitcrk@aol.com](mailto:summitcrk@aol.com) or 775 786-4515

### **CLASSIFIEDS**

**PVC Pipe For Sale**—Sierra Nevada Community Sailing, a non-profit group, has a bunch of 20 ft. PVC C900 Underground Water Main Pipes for sale (8"-24" diameters), along with 7 pallet boxes of joints, elbows, junctions & fittings. Please contact Greg Cook, SNCS President at 775-771-9838 or email him at [President@NVSailing.org](mailto:President@NVSailing.org)

**WANTED: Used Diamond Core Saw.** We would like to purchase a used diamond core saw in good shape, preferably with a 220V, 3 phase motor, 3.5 HP or greater, and able to cut up to HQ-sized core. Please contact Charles "Casey" Ross, Consulting Economic Geologist. Email: [c.ross@citadelresources.com](mailto:c.ross@citadelresources.com). Phone number: 435-421-1238.

### **OTHER UPCOMING EVENTS**

**3 NOVEMBER DREGS, Denver Regional Exploration Geologists' Society. Speaker: Dr. Tommy Thompson, "Carlin-Type Gold Deposits".** Social at 6 p.m. Presentation at 7 p.m. Berthoud Hall, Room 241, Colorado School of Mines, Golden CO.

**3-9 NOVEMBER** The **2014 Alaska Miners Association Fall Convention** will be held November 3-9 at the Dena'ina Civic and Convention Center in Anchorage. Click here to Register: <https://alma.memberclicks.net/>

**4 NOVEMBER Arizona Geological Society, Tucson AZ. Speaker:** Isabel F. Barton: Historical Development & Current State of Geological Research in the Central African Copperbelt. Sheraton, 5151 E Grant Rd. (& Rosemont), Tucson AZ 85712. Begins @ 6 pm. Dinner is currently sold out. Please join them for the social hour from 6-7 p.m. and the Talk begins at 8 p.m.

**6 NOVEMBER Nevada Petroleum & Geothermal Society, Reno, Nevada. Speaker: and Topic To Be Announced.** 6:30 PM, Ramada Reno Hotel; 1000 East 6th St., Reno NV 89512. Please RSVP by Tuesday, November 4, 2014. [VEhni@aol.com](mailto:VEhni@aol.com)

**10 NOVEMBER Northern Nevada Section of SME: Speaker: Will Robertson,** Newmont Mining Corp., Elko, Nevada. Title: **"Geotechnical Engineering at the Leeville Underground Gold Mine, Carlin, Nevada"**. Circus-Circus Mandalay Room, Reno NV. Happy Hour @ 6 pm, Dinner @ 6:45 pm, Talk @ 7:30 pm. Dinner \$30; Non-member \$35. Students Free. RSVP by 5 pm on Wednesday, November 5, 2014. Send RSVP to Brooke Miller 775-303-2835 or [NNevSME@gmail.com](mailto:NNevSME@gmail.com)

**13 NOVEMBER Nevada Water Resource Associates—2014 Northern Nevada Dinner Forum.** Topic: Modflow and ASR Opportunities in the Humboldt Basin, The Nugget, Sparks NV. No-Host Bar 5:15 pm; Dinner 6:15 pm; Presentation 7:15 pm. Contact Tina Triplett for more information at [creativerno@charter.net](mailto:creativerno@charter.net). Register online at: <http://www.nvwra.org/2014northernnvddinnerforum>.

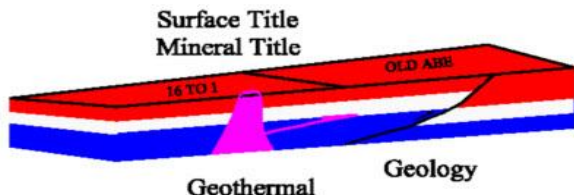
**30 NOVEMBER - 6 DECEMBER. American Exploration and Mining Association Meeting, Reno, NV, USA (formerly Northwest Mining Association). Website: [www.miningamerica.org](http://www.miningamerica.org).** Discount registration due by November 16, 2014.

**14-24 MAY 2015, GSN SYMPOSIUM 2015: NEW CONCEPTS AND DISCOVERIES.** J.A. Nugget, Sparks, Nevada. Pre- and Post-Field Trips, Short Courses, Exhibits and Technical Program. For more information please contact Molly Hunsaker, [mollymhunsaker@2015GSNsymposium.org](mailto:mollymhunsaker@2015GSNsymposium.org) or visit the website: [www.gsnv.org/2015-symposium](http://www.gsnv.org/2015-symposium). **REGISTRATION IS NOW OPEN & EXHIBITS ARE 2/3 SOLD!!**

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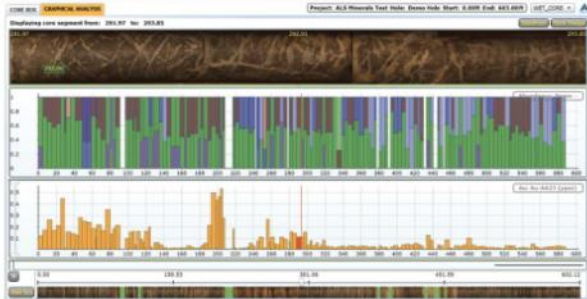


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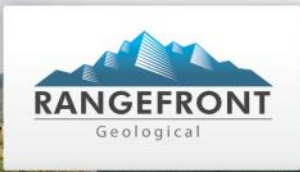
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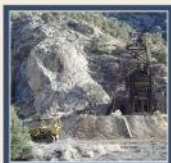
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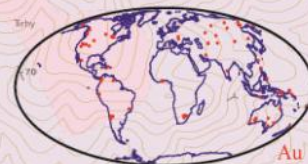
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