



Geological Society of Nevada Southern Nevada Chapter Newsletter

October 2005

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Geology of Uranium Mineralized, Collapse Breccia Pipes in the Grand Canyon Area, Northwestern Arizona

DATE: Thursday, October 27, 2005

SPEAKER: Dieter A. Krewedl, Ph.D.
GSN President

LOCATION: Room 105 Lilly Fong Geoscience Bldg.

TIME: 6:00 p.m. Social *Half-Hour*
6:30 p.m. Chapter Business
6:45 p.m. Presentation

SPONSOR: Eklund Drilling Company

Geological Society of Nevada, Southern Nevada Chapter

University of Nevada, Las Vegas
4505 Maryland Parkway, Box 4010, Las Vegas, NV 89154-4010
<http://geoscience.unlv.edu/GSN/gsnsc.htm>

We would like to thank Dr. Brenda Buck (UNLV) for presenting her research during our last meeting and also the many attendees that donated money for refreshments. We had a great turnout! For October's meeting we have GSN President Dieter Krewedl and food & refreshments sponsored by Eklund Drilling Company. Also upcoming is our Fall 2005 field trip to the Mojave National Preserve on November 5 and our 2nd annual Holiday Party sponsored by the Nevada Book & Mineral Company on December 17.

~ Robyn

MEMBERSHIP:

If you haven't renewed your membership it's time to do so now. **Regular membership is \$30 & student membership is \$15. Chapter dues is only \$5.** Lance Taylor of Geotemps

has offered to pay the \$15 dues of full-time students in Nevada. If you are enrolled full-time just write that on the membership form and enclose just the \$5 chapter dues. Please be sure to thank Mr. Taylor and Geotemps

because this is a very generous gesture! Please mail the form with your payment to GSN in Reno. *We are sorry but we cannot take payments here.* For more information on chapter membership please visit the main GSN website at www.gsnv.org.

McCaw School of Mines Volunteers:

Bill Durbin of the State of Nevada Division of Minerals brought to our attention that the McCaw School of Mines in Henderson is in desperate need of docents (tour guides). The McCaw School of Mines opened in January 1997 at the Gordon McCaw Elementary School as a field trip destination for Clark County K-12 students to learn about mining. The facility is run using donations and volunteers. They need docents for a few hours a month to guide students through the mine. No experience is necessary but as usual some scientific background may help. For more information visit their website at <http://www.ccsd.net/schools/mccaw/mccawmine/> (although the contact information on the site may be outdated). Please contact Dorothy Webb at 702.558.8501 or 702.813.0602 for more information.

CHAPTER WEBSITE:

Joe has been working very hard on our chapter website, keeping it updated with news and information. Please check it out at <http://geoscience.unlv.edu/GSN/gsnsc.htm>. On this site we list information about our officers, past and future meetings, sponsors, members, fieldtrips and photos from various GSN activities. We also maintain a jobs page with job listings that may be of interest to local geologists and other scientists.

OFFICER ELECTIONS:

We will be holding our annual Southern Nevada Chapter officer elections in March 2006. If you are interested in becoming an officer please provide us your name by January 1, 2006. You must be a GSN member

and be willing to put time and enthusiasm into our chapter. We have put a lot of time into making this chapter successful and we would like this to continue. This is also a great opportunity for students to become involved in the workings of a professional society. Our chapter Secretary and Hostess Melissa Hicks will be moving on to an internship with ExxonMobil in Houston and I (Robyn Howley) will be stepping down to put more focus on my dissertation research and prepare for my comprehensive exams (I still haven't decided yet whether I will continue with the newsletter). For both of us this has been a great experience and we have met so many wonderful people and made great professional contacts. I highly recommend coming to the meetings and seeing what we are about and talking to Joe, Melissa, Paul or myself to get an idea of some of the things we do. *Remember to give us your name by Jan. 1st!*

ADS & SPONSORS:

GSN is a non-profit organization and our chapter relies on meeting sponsors and advertisements to keep our chapter up and running. If your business would like to sponsor social hour at one of our southern Nevada chapter meetings please contact Robyn Howley. If you would like to place a paid advertisement in this newsletter and on our website please contact Jim O'Donnell at 702.293.5664 or jim_odonnell@cox.net. Please see our current advertisements at the end of this newsletter and support our sponsors.

FALL FIELDTRIP:

OK. The fall fieldtrip was 'officially' announced last month and is slated for **Saturday- November 5, 2005**. Once again I'd like to force the GSN Southern Chapter Website down your throats as the best place to search out information on this trip as it comes together. Anyone interested in attending please send an email to me, Joe

Kula at jkula@unlv.nevada.edu. I'll need to keep a running headcount of participants so that we can deal with other logistics, such as transportation. **In your email PLEASE make a note as to whether or not you would be persuaded to attend or not attend if the trip was extended to Saturday and Sunday.** Right now, it is a one day trip, but some requests have been made for it to be a campout, and we'd like to know how many people agree with that.

So, if you missed the first announcement- this trip is going to circle through the Mojave National Preserve in southern California. We'll look at a variety of geologic elements including thrust faults, shear zones, eolian deposits, batholiths, continental margin sediments, volcanic deposits, There's probably something for everyone there! There is a fieldtrip waiver attached to this issue of the Newsletter that we ask **ALL** participants to print out, fill in and return to Robyn and/or me (Joe) prior to the trip. Consider this form your registration. Of course, any questions, comments, or other

regarding the trip are welcome either by email (above) or phone (702.895.4255). Oh, and keep checking the website...I'll get more info up there as soon as I can! Thanks - Joseph

PARKING:

Visitor parking is available in the metered spots near LFG, in front of and behind the library. Metered parking is \$.75/hour (7 am until 7 pm) and is the cheapest parking available. You can also purchase a daily parking pass (\$2) from the Parking Services Office that will allow you to park in student parking (several minute walk to LFG). For students who have a student permit, you may park in faculty/staff parking in front of LFG after 5:30 pm. Anyone who parks in faculty/staff without a permit does so at their own risk. For information on parking at UNLV please visit the UNLV parking services website at <http://parking.unlv.edu>. This site also includes maps of the campus and directions.

Geology of Uranium Mineralized, Collapse Breccia Pipes in the Grand Canyon Area, Northwestern Arizona

Dieter A. Krewedl, Ph.D.

Abstract

Exploration for uranium mineralized breccia pipes throughout the Grand Canyon area of northwestern Arizona has been reactivated due to recent rise in the price of the metal. Exploration was most active during the 1980s when high grade uranium was discovered and mined in a number of collapse breccia pipe deposits that generally average 0.60 % uranium and range from 2 to 4 million pounds.

Uranium mineralized collapse breccia pipes occur in Mississippian to Triassic age rocks throughout the entire Grand Canyon area. Collapse breccia pipes exposed on the canyon walls of the Colorado River were studied to understand their formation and assist in their exploration on the plateaus located north and south of Grand Canyon National Park. A detailed discussion will be presented on the discovery and geology of the EZ-2 collapse breccia pipe located on the Arizona Strip, north of the Grand Canyon.

The morphology of the collapse breccia pipes consist of two interrelated parts: the throat and the collapse cone. Originating in the Mississippian Redwall Limestone, the throat consists of downward

displaced and brecciated strata as young as the Triassic Chile Formation. The collapse cone surrounds the throat above the Coconino Sandstone level and was formed by dissolution primarily of the evaporites within the Kaibab and Toroweap Formations. Its area of influence is much wider than the throat and is expressed on the plateau surfaces by concentric, inward dipping beds.

Uranium mineralization is found mostly within the collapse breccia pipe's throat in reduced zones within strata that range from the Seligman Member of the Toroweap Formation to the Supai Group. Associated trace elements include copper, arsenic, nickel, lead, zinc and silver.

The source of the uranium was probably from the volcanic rocks within the Chinle Formation, which covered the entire region during Triassic time. The uranium either moved directly down the pipe's throat or indirectly by moving laterally through an aquifer such as the Coconino Sandstone. Precipitation of the uranium occurred when the metal rich oxidizing solutions encountered the highly reduced breccia pipe environment. Reduction in the described EZ-2 collapse breccia pipe was caused by hydrocarbons that probably migrated out of the Brady Canyon Member of the Toroweap Formation and into the porous breccia pipe. The mineralizing event probably occurred sometime between the Late Triassic and Cretaceous time.

Speaker's Background

Dr. Krewedl received his Ph.D. degree in Geology from the University of Arizona. He has a wide array of domestic and international uranium and precious metal exploration and development experience, which was gained during more than 35 years in the mining industry.

Dr. Krewedl was with Pathfinder Mines Corporation, a wholly owned subsidiary of the French uranium company Cogema, for 23 years and was Pathfinder's Vice President, Exploration from 1990 to 1995. Pathfinder, an active and successful uranium explorer and producer, was variously owned by Utah International, General Electric and BHP before its sale to Cogema in 1981. Dr. Krewedl implemented and managed exploration programs throughout the western United States and Germany and was instrumental in a number of uranium exploration and development successes during his tenure, including the discovery of the Green Mountain uranium deposit in Wyoming, high grade uranium breccia pipe deposits in Arizona and uranium deposits in the Grants, New Mexico mineral belt.

Following Pathfinder, Dr. Krewedl joined Echo Bay Mines and became its Vice President, Exploration from 1996 to 1997. At Echo Bay, he managed an aggressive domestic and international gold exploration program with an annual budget in excess of \$40 million, a professional staff of over 100 people, seven exploration offices and over 35 early to advanced staged exploration projects.

Following Echo Bay, Dr. Krewedl held the position of Senior Vice President, Exploration for Idaho based Coeur d'Alene Mines from 1998 through 2003. In this position, he was responsible for exploration at Coeur's precious metals mines as well as its worldwide exploration program. He was instrumental in the identification, acquisition, and successful exploration and development of several important precious metal projects including the Cerro Bayo Mine in Chile, the Martha Mine in Argentina and the San Bartolome Project in Bolivia.

Dr. Krewedl retired from Coeur at the beginning of 2004 and is presently serving as President of the Geological Society of Nevada (2004-2006). He also serves on the Board of Directors of three junior uranium and gold exploration companies.

Professional Experience

Currently serving as President of the Geological Society of Nevada (2004-2006) and on the Board of Directors for three junior uranium and gold exploration companies

- | | |
|-------------------------|--|
| 5/98 to 12/03 (Retired) | Coeur d'Alene Mines Corporation, Coeur d'Alene, Idaho
<i>Senior Vice President, Exploration</i> |
| 6/96 to 2/98 | Echo Bay Mines, Denver, Colorado, <i>Vice President, Exploration</i> |
| 2/96 to 5/96 | Conquistador Mines Ltd., Medellin, Colombia, <i>General Manager</i> |

A total of 23 years with Pathfinder Mines (Cogema)/Utah International

- 1990 to 1995 Pathfinder Gold Corporation (Cogema), Sparks, Nevada, *Vice President, Exploration*
- 1984 to 1990 Pathfinder Mines Corporation (Cogema), St. George, Utah, *Manager, Exploration*
- 1979 to 1984 Pathfinder Mines Corporation (Cogema), Albuquerque, New Mexico
District Geologist
- 1976 to 1979 Utah International, Bavaria, Germany, *District Geologist*
- 1973 to 1976 Utah International, Riverton, Wyoming, *Senior Geologist*
- 1967 to 1968 Texaco, New Orleans, LA, *Petroleum Geologist*

Education

Doctor of Philosophy Degree, Geology, University of Arizona, Tucson, Arizona in 1973

Master of Arts Degree, Geology, Bowling Green State University, Bowling Green, Ohio in 1967

Bachelor of Science Degree, Geology, University of Dayton, Dayton, Ohio in 1965

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The Geological Society of Nevada, Southern Chapter
Las Vegas, Nevada
Field Trip Release of Liability Form

I, _____ understand and agree that field trips sponsored by the Geological Society of Nevada, Southern Chapter (GSN-SC) involve certain risks and that regardless of the precautions taken by the GSN-SC, some bodily injuries may occur.

Specific risks/hazards involved in field trips may include but are not limited to:

1. Driving to or from the field trip localities.
2. Twisting of joints or breakage of bones while hiking over irregular ground.
3. Snakebite, scorpions, and/or other wildlife poisons and/or toxins.
4. Problems related to exposures of elements such as: heat prostration, dehydration, sunburn, frostbite, death and allergic reactions
5. Injury from flying rock fragments related to breakage with a rock hammer.
6. Danger of being struck by automobiles while examining outcrops along roads.
7. Hydrochloric acid diluted with water.

Knowing this information, in consideration of my participation in field trips sponsored by the GSN-SC, I expressly and knowingly release the GSN-SC of Las Vegas and the Geological Society of Nevada (GSN) headquarters office in Reno, and all of their officers, agents, volunteers, and employees, from any and all claims and causes of action for property damage, personal injury or death sustained by me arising out of any travel or activity conducted by or under the auspices of the GSN-SC and GSN caused by risks associated by this activity and/or the negligence of the sponsoring group.

In addition, I understand and agree that the GSN-SC cannot be expected to control all of the risks articulated in this form but may need to respond to accidents and potential emergency situations. Therefore, I hereby give my consent for any medical treatment that may be required during my participation with the understanding that the cost of any such treatment will be my responsibility. The GSN-SC and GSN do not carry medical or accident insurance for the activities mentioned unless the participants are informed otherwise. As such, participants should review their personal insurance portfolio.

Finally, I voluntarily and knowingly agree to protect, hold harmless, and indemnify the GSN-SC and GSN, and their officers, agents, volunteers, and employees, against all claims, demands, or causes of action for property damage, personal injury, or death, including defense costs and attorney's fees arising out of my participation in the field trip or activity sponsored by the GSN-SC and GSN.

I have read the agreement and have willingly signed for the consideration expressed and with a full understanding of its purpose. Participant represents that he/she is eighteen (18) years of age or older and is otherwise competent to execute this agreement, or that his/her legal guardian is also signing.

Print Name _____

Date of Birth _____ Phone number _____

Emergency Contact & Number _____

Email address _____

Participant signature _____

Guardian signature (if less than 18 years old) _____