



MONTANA GEOLOGICAL SOCIETY

NEWSLETTER

December 2015

MGS Luncheons:

Jan 12th : Dr. Morgan Brown presents *Marcellus Shale PSDM Case Study - Improved Structural Imaging and Rock Properties* page 4

Members can RSVP by email or by calling Doretta Brush at Ballard Petroleum 406-259-8790

All meetings are held at the Billings Petroleum Club at 11:45 a.m. unless otherwise noted

MGS HOME PAGE:

<http://mtgeo.org>

MGS EMAIL:

montanageologicalsociety@gmail.com

Other Announcements:

2015 Oilies Party
page 5-6

MGS Membership Renewal page 7-9

Season's greetings MGS Members,

MGS Vol. 59 No. 7

The holidays are the best! Great food, time off from work, and plenty of friends and family around. There is a lot to celebrate this year; we made it to December! It has been a rough year in the commodity business. I work in oil & gas and right now we are working up our budget for the coming year. It'll be skinny year, but I'm feeling pretty thankful to still have a job. My brother is also geologist and works at a copper mine in New Mexico, where if anything, the commodity bust is worse. He's also very thankful to still be pulling in a paycheck. Our family feels very fortunate however we realize that some of our members receiving this newsletter will be among those that are trying to find a new job in a tough environment. Whether you have a job or not, everyone knows that folks are looking for jobs all over which can be very challenging in this competitive environment. That is why I suggest we all take advantage of the Oilies Christmas Party to enjoy each other's company, and equally important, to network with others in the industry here in Montana and the rocky mountain region. As geologists, we rely on our professional relationships. A gathering like the Christmas party is a great way to renew old acquaintances and build new friendships. We have all benefited from kind actions of others in our industry, and now let's be sure to pay it forward and do the same for others.

On a related note, it is a skinny year. So far donations to the Christmas party are (understandably) much lower than they were last year. We have found ways to cut back our expenses this year, however we also would like to ask if anyone can donate or pledge an amount for the party. This way we can account for it in our planning budget. A large number donating \$5 or \$10 can really make a difference in a down year. If you'd like to pledge a donation for the Oilies Party please contact Sarah Edwards at sedwards@sm-energy.com or 406-869-8763.

On an unrelated topic, the need for our society has never been greater than now. A couple of weeks ago Jack Warne and myself met up with three high school geology teachers to do a quick fieldtrip on the Rims above 27th. As you can imagine, our quick field trip ended up stretching out until darkness with us shining flashlights on the outcrop still in search for fossils. It has never been as easy for us to access quality geological research and share it with curious young minds than it is today, but it doesn't happen accidentally. Jack Warne has been a great example of reaching out to schools and civic groups to share what he knows about the local geology. Especially impressive is the pamphlet that he has written about the geology around Billings. Please offer to do geological presentations at your kids' (or grandkids') schools, scout groups, clubs and anywhere else you might have a curious audience.



2015-2016 OFFICERS

President

Riley Brinkerhoff 869-8732

1st Vice President

Kevin Chandler 272-1605

2nd Vice President/Website

Coordinator

Sarah Edwards

Treasurer

Preston Kerr

Secretary

Felipe Pimentel

Past President

Mark Millard 255-8613

NEWSLETTER EDITOR

Sarah Edwards 869-8763

BOARD OF DIRECTORS

Mike Bryant

Steven W. VanDelinder

Betsy Campen

Robert Schalla

AAPG DELEGATES

ROCKY MOUNTAIN

SECTION

Robin P. Diedrich

Alternates:

Don French

RMS-AAPG Foundation:

Rob Diedrich 303-830-5875

Chair for 2017 AAPG Section

Meeting

Robert Schalla

COMMITTEES

Awards and Continuing

Education:

Anna Phelps

RMS-AAPG Foundation:

Rob Diedrich 869-8643

Field Trips:

Gary Hughes 861-2072

Social:

Betsy Campen 652-1760

Christmas Party:

Sarah Edwards 869-8763

University Liaison:

Steven W. VanDelinder

Publications:

Duncan McBane 252-3170

Montana Oil & Gas

Fields Update:

Jim Halvorson 656-0040

PUBLICATION SALES

Doretta Brush 259-8790



To echo thoughts from this issues President's letter, it is important to know that there **ARE** curious young minds out there who **ARE** very eager to learn about science. We received a very thoughtful thank you letter and poster from the *Girls-n-Science* Committee for our efforts at the *Chicks in Science* 2015 event. There were over **950** girls in attendance and based on the traffic that the MGS/SPE booth received during the event, I believe it! The girls were very excited to learn more about geology, engineering, and career opportunities. It's imperative that we inspire kids and especially young girls at this impressionable age to pursue careers in science and math. So PLEASE remember to volunteer for upcoming events or opportunities where you can share your knowledge and experience to foster their learning.



STEM Billings Flight Event

Five MGS members, Anna Phelps, Sam Fluckiger, Chantel Lines, Murray Dighans, and Felipe Pimentel, volunteered at the STEM Billings Flight Event at McKinley Elementary School on November 14, 2015. The event was attended by over one hundred 3rd, 4th, and 5th grade students who learned about the mechanics of flight through hands-on activities such as constructing balsa wood gliders and lunar landers. There were demonstrations on Bernoulli's Principle, hot air balloons, and birds of flight from Zoo Montana.



MGS Members from left to right: Anna Phelps, Sam Fluckiger, Chantel Lines, and Felipe Pimentel.



Murray Dighans helping student construct balsa wood gliders.



The next STEM Billings event will be Energy and Engineering on **February 20** at Riverside Middle School and will be open to Kindergarten to 6th graders. If you would like to be involved, or volunteer, contact Anna Phelps at aphelps@sm-energy.com.

MGS Luncheon Meeting

Tuesday, January 12th

11:45 am – Billings Petroleum Club

Please join us for lunch (\$14) and the talk (no charge)

RSVP – montanageologicalsociety@gmail.com

An email reminder will be sent 3 days prior to the talk

DR. MORGAN BROWN

NEOS Seismic Imaging Group



Marcellus Shale PSDM Case Study - Improved Structural Imaging and Rock Properties

In this presentation, we highlight the performance of PreStack Depth Migration (PSDM) on an ION GeoVentures multiclient survey from northwest Pennsylvania, the GroundhogSCAN 3D. Provided that reflection tomography has produced an accurate interval velocity model, PSDM provides three key "structural imaging" benefits (over conventional time imaging or PSTM) for horizontal drilling applications: 1) structural simplification, 2) improved focusing of faults and steep dips, and 3) correction of lateral mis-positioning due to velocity variations. All three benefits materially reduce the risk of dropping out of zone during geosteering. Looking into the future, however, PSDM will also improve the accuracy of any rock property attributes derived from migrated gathers. In this presentation we focus on azimuthal velocity anisotropy (HTI), an indicator of horizontal stress gradient, and show convincing evidence that we have detected a change in regional horizontal stress across the Salina Salt, a known detachment surface during the Appalachian Orogeny. Moreover, we demonstrate that by using PSDM for the attribute analysis, we remove false HTI effects from PSTM gathers that were caused by lateral velocity variation.

About Morgan Brown:

Dr. Morgan Brown holds degrees in applied mathematics (BA, 1997) from Rice University and in geophysics (PhD, 2004) from Stanford University. He worked in geophysical R&D at Hess Oil and 3DGeo, before joining a depth imaging startup, Wave Imaging Technology Inc. He served as CEO from 2008 to the company's sale in 2013 to GeoCenter. After consulting for two years, he recently joined the NEOS Seismic Imaging Group in Denver as a Subject Matter Expert in Depth Imaging.



Cordially invites you to the
2015 Oilies Christmas Party



Where: **The Petroleum Club**

Crowne Plaza Hotel – 22nd Floor
27 N. 27th St, Billings, MT

When: **Thursday, December 17th, 2015**
5 pm to 10 pm

What: Live music, food, beer and wine.
Cocktails available for purchase

**Come eat, drink and be merry while making
great industry contacts.**

Should you or your company care to make a donation towards this event, please contact your society.





MUSIC FOR GEOLOGISTS BY GEOLOGISTS

The MGS is very proud to announce that there will be two bands performing at the Oilies 2015 Holiday party this year and **both** groups are composed of MGS members! Who knew our membership was filled with such musical talents... other than just licking rocks! Be sure to catch what is sure to be a spectacular musical performance.

PLOTS AND ROCKS

Back from a recent tour of local grocery stores, recycling collection facilities, and same-day pediatric care centers, our very own MGS Past President Mark Millard, and his smarter, stronger, younger, and more attractive spouse, Erica Millard, will be playing at the Oilies party this year! These two make up the folk duo known to most of Billings as 'Plots and Rocks.' They are excited to make the Oilies party their last official gig of 2015. Erica plays guitar and sings while Mark also sings and plays whatever he can find within reach, (ranging from mandolins, to tin cans and frying pans, to cigar boxes, etc.). For a sneak peak of the racket these two make, come on down to the Yellowstone Cellars and Winery Sat Dec. 12th, from 7-9 pm where they will be the featured artists for the evening (shameless plug). See you at the Oilies!



Plots and Rocks perform live (Left: Mark Millard, Right: Erica Millard)!

JESS AND BOB/BOB AND JESS

MGS members Jessica Renstrom and Bob Schalla have formed a band, entitled "Jess and Bob" (sometimes known as "Bob and Jess"). They play and sing an eclectic mixture of classic country and rock tunes. The band has been together since the summer of 2014 when an after-work discussion at the Montana Brewing Company established that Jessica was a singer and Bob was a wannabe singer and guitar player. The Oilies Christmas party will be their debut performance.

MGS MEMBERSHIP RENEWAL

It's that time of year again--membership renewals for 2016. This year we are able to offer quick and easy renewal online via **PayPal**. You can even pay as a guest if you don't have a PayPal account. Instructions for PayPal renewal are located on page 8.



Of course you can still renew via mail. Please print off the renewal form on page 9, fill it out and mail it in along with your dues for 2016 to the PO Box below. Be sure to update your contact information for our records if you have recently moved or changed employment.

We appreciate your efforts to help maintain and grow the association and look forward to another great year!

Best Regards,
The MGS

Please mail your form and dues to the address below:

*Montana Geological Society
P.O. Box 844
Billings, MT 50103*

To become a member or update your contact information, apply online at:

STEP 1 <http://mtgeo.org/join/membership-application/>

The screenshot shows the 'Membership Application' form on the MGS website. The form includes fields for Name (First, Last), Email, Company/Status, Contact Information (Address, City, State, ZIP Code, Phone (Field), Phone (Home), Phone (Cell), Email), and a checkbox for 'I am a returning member'. The MGS logo and navigation menu are visible at the top.

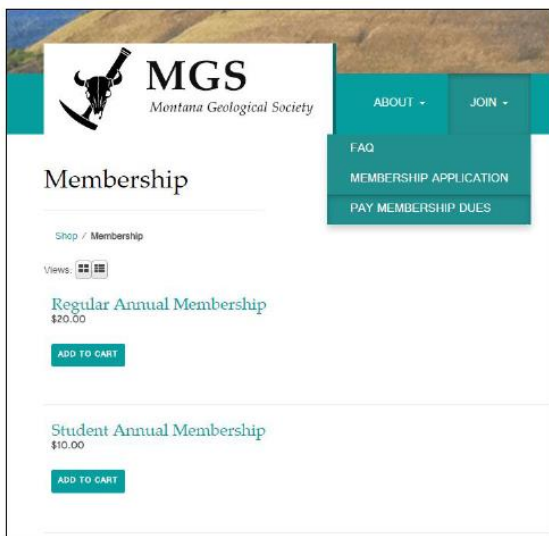
Renew your MGS
Membership
TODAY!



The MGS has a PAYPAL account now! To pay your dues online click on the following link:

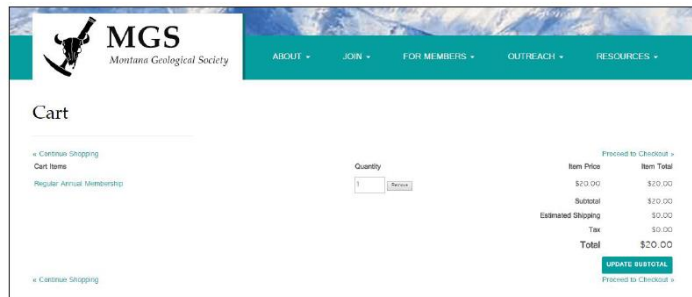
<http://mtgeo.org/shop/category/membership/>

*Membership dues: \$10 student, \$20 regular



Click on the appropriate membership and proceed to checkout.

STEP 3



If you already have a PayPal account, you can log in for quicker payment, otherwise, you can pay as a guest by filling out your billing and credit card information.

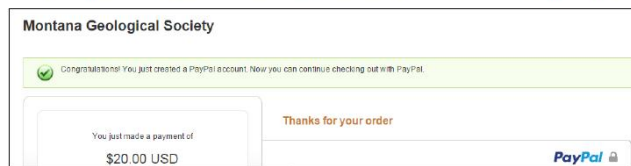
The screenshot shows the 'Checkout' page on the MGS website. It includes a table with columns for 'Cart Item', 'Quantity', 'Item Price', and 'Item Total'. The table shows one item: 'Regular Annual Membership' with a price of \$20.00. Below the table, there are fields for 'Contact Information' (Name, Email, Password, Confirm Password), 'Billing Address' (Address, City, State, ZIP Code, Phone), and 'Payment Information' (Card Type, Card Number, Expiration Date, CVV, Cardholder Name). There is a checkbox for 'I am a returning member' and a 'PayPal' logo at the bottom right.

STEP 4

It's just that easy!

A receipt will be sent to our MGS email account however be sure to also save a copy for your records.

STEP 5



MONTANA GEOLOGICAL SOCIETY

P.O. Box 844

Billings, MT 59103

Membership Renewal

Last Name _____

First Name _____ Middle Initial _____

ANNUAL DUES:

_____ \$20.00 Regular

_____ \$10.00 Student

Please update the information below if needed. Please leave blank if nothing has changed:

Company/Affiliation _____

Mailing Address (work or home)

Street _____

City _____ State _____ Zip _____

Phone (w) _____ Phone (h) _____ Phone (c) _____

E-Mail _____

AAPG Member (please circle) YES NO

Education (School, Degree, Year)

Degree #1 _____

Degree #2 _____

Degree #3 _____



**INDEPENDENT EXPERTISE IN
WATER RESOURCES AND THE ENVIRONMENT**

General Services

- Hydrology
- Geology
- Engineering

Oil and Gas Environmental Consulting Services

- NEPA CATEX/EA/EIS
- Environmental Permitting
- Environmental Compliance
- GIS/Database
- Water Management
- Environmental Due Diligence
- Expert Testimony Services
- Remediation

**Hydro
Solutions Inc**

HELENA, MT (406) 443-6169
BILLINGS, MT (406) 655-9555

HSI@HYDROSI.COM

WWW.HYDROSI.COM

SES



**Geosteering
Software**

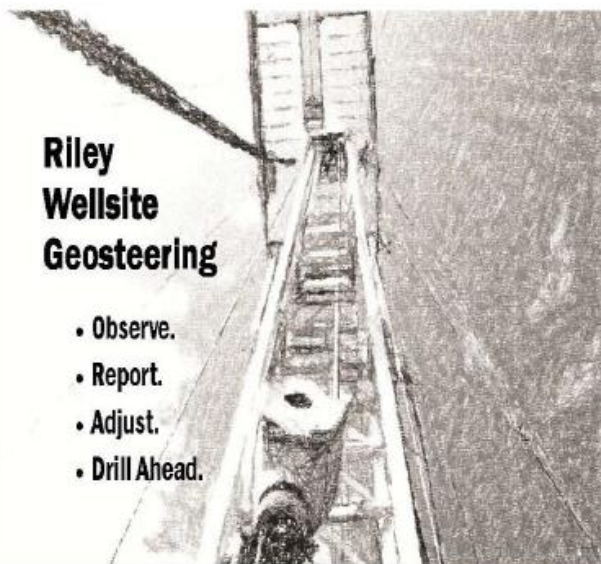
**If horizontal
wells affect
your bottom
line, visit us
online or call.
You'll be glad you did!**

SES is for geologists who are dissatisfied with drafting-tool methods of geosteering horizontal wellbores. SES is 3D technical geosteering software that makes *wellbore stratigraphic tracking quick-n-easy, accurate, and easily shared*. Unlike any other geosteering software, SES provides a complete suite of software features to handle your horizontal drilling needs.

Ph. 720-279-0182

SES Geosteering
Software

www.makinhole.com



**Riley
Wellsite
Geosteering**

- Observe.
- Report.
- Adjust.
- Drill Ahead.

Jackson Riley, Geologist
406.780.0627 (cell) • 406.633.9487 (office)
geology@rileywellsite.com

Hydrometrics, Inc.

WWW.HYDROMETRICS.COM

Founded in 1979, Hydrometrics provides an expansive range of science and engineering services. We have serviced many projects, large and small for the petroleum and mining industries, ranging from the Arctic Circle to South America.

For more information Contact:

Billings, MT - Al Hilty, P.G.
(406) 656-1172 ahilty@hydrometrics.com

Helena, MT - Mike Wignot, P.E.
(406) 443-4150 mwignot@hydrometrics.com

Missoula, MT - Doug Parker, P.G.
(406) 721-8243 dparker@hydrometrics.com

- Environmental/Civil Engineering
- Geotechnical Engineering & Soil Testing
- Water Resources Engineering
- Storm Water Management, Dam Design & Investigation
- Hydrogeology & Geochemistry
- Design Plans & Specifications
- Graphic/Drafting Services
- Data Management Services
- Regulatory Compliance
- Environmental Analysis
- Industrial & Mining Services
- Solid & Hazardous Wastes
- Soil & Water Field Testing
- PowerProbe & Auger Drilling

2015 Advertising Rates:

Full Page \$100/month;

½ Page \$50/month;

¼ Page \$25/month;

Business Card \$10/month.

All ads must be prepaid.
Send ad and payment to:
MGS, P.O. Box 844
Billings, MT 59103.

MONTANA GEOLOGICAL SOCIETY

PUBLICATION	QUANTITY	PRICE	TOTAL
2006 Montana Oil & Gas Fields CD		\$65.00	
2006 AAPG Datapages - MGS Publications DVD		\$180.00	
2006 AAPG Datapages - MGS Publications DVD (MGS Member price)		\$150.00	
2000 50th Anniversary Symposium		\$125.00	
1998 8th Int'l Williston Basin Symposium		\$55.00	
1998 8th Int'l Williston Basin Symposium Core Workshop		\$30.00	
1997 Big Horn Basin Symposium		\$50.00	
1997 MGS-TRGS: The Edge of the Crazies		\$25.00	
1997 AAPG - Rocky Mtn. Section Meeting / Abstract Volume		\$16.00	
1995 7th International Williston Basin Symposium - Core Workshop		\$30.00	
1995 7th International Williston Basin Symposium		\$100.00	
1995 Big Horn Basin Symposium		\$40.00	
1996 AAPG - Rocky Mtn. Section Meeting / Abstract Volume		\$25.00	
1993 Energy and Mineral Resources of Montana		\$54.00	
1991 6th International Williston Basin Symposium		\$55.00	
1991 Geology & Horizontal Drilling of the Bakken		\$50.00	
1991 AAPG - RMS Field Trip: Beartooth Mountains		\$7.50	
1991 AAPG - RMS Field Trip: Eagle Sandstone, Billings		\$7.50	
1991 RMS Field Trip #1 Nye-Bowler Linemont		\$7.50	
1991 Sequence Stratigraphy of Eagle Sandstone		\$7.50	
1990 Bakken Workshop Short Course Study Notes #1		\$12.00	
1989 Geologic Resources of Montana		\$80.00	
1986 Geology of the Beartooth Uplift		\$45.00	
1985 Montana Oil & Gas Fields		\$55.00	
1984 Northwest Montana & Adjacent Canada		\$45.00	
1978 Economic Geology of the Williston Basin		\$100.00	
1971 Stratigraphic Names of Montana		\$10.00	
1957 BGS 2nd Annual Centrail Montana Field Conference		\$12.50	
Shipping and Handling charges - \$5.00 per CD/DVD \$8.00 per book			
Total Due			

Billing / Shipping Information

Name _____ Company _____
 Address _____ City, State, Zip _____
 Email Address _____

Please make checks payable to: Montana Geological Society. Visa and MasterCard also accepted.

Visa / MasterCard (circle one) _____ Expiration Date _____
 Name as it appears on the Card _____
 Phone Number (_____) _____

Mail orders: Montana Geological Society, PO Box 844, Billings, MT 59103

Fax orders: Doretta Brush, MGS Publications sales, (406) 259-3884

Email orders: dbrush@ballardpetroleum.com

Phone orders: Doretta Brush (406) 281-8228