

NOVEMBER 2018 NEWSLETTER

Mancos Shale to Point Lookout
Sandstone, Durango, CO

FOUR CORNERS GEOLOGICAL SOCIETY

NOVEMBER LUNCHEON MEETING:

THEME: THE MANCOS SHALE in the SAN JUAN BASIN

- SPEAKER 1:** Jack Rosenthal, VP of Geoscience, DJR Energy
TITLE 1: *Workflows on developing a hydrocarbons-in-place model for the Mancos oil rim in the San Juan Basin*
- SPEAKER 2:** Guillermo DeHerrera, Director, Jicarilla Oil & Gas Administration
TITLE 2: *Oil and gas potential on the Jicarilla Apache Nation and gas export options in the San Juan Basin*
- POSTER 1:** Paul Spear, Formerly Logos Resources & Connoco Phillips:
Defining the pay zones - Petrophysical type logs for the San Juan Basin Gallup and Mancos hydrocarbon plays

- POSTER 2:** Sabina Kraushaar, Juniper Resources:
Stratigraphic relationships of the El Vado, Tocito and Gallup Formations, southern Mancos oil rim, San Juan Basin
- DATE:** Thursday, November 15th
TIME: 11:00-11:30am Poster Session & Social, 11:30-12:00 Lunch, 12:00-1:00pm Speakers.
LOCATION: San Juan Country Club, 5775 Country Club Rd., Farmington, NM
COST: \$20/person with RSVP by deadline. 25/person post deadline and/or at the door while food lasts. \$2/person talk only. The first four students to register from FLC OR SJC can attend for free as long as they make the deadline.
RSVP: By Tuesday, November 12th at noon. Students, members who are pre-paying and members who just want to reserve a spot and pay at the door can all register at this link (use your preferred buttons): <https://fourcornersgeologicalsociety.org/event/oil-exploraion-mancos-shale-san-juan-basin/> . Or you can RSVP directly to Jim Corken using our officer contact link: <https://fourcornersgeologicalsociety.org/about/> .



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Four Corners Geological Society, P.O. Box 1501, Durango, CO 81302
www.fourcornersgeologicalsociety.org

BIOGRAPHY: Jack Rosenthal, VP of Geoscience, DJR Energy

Save the Date!

December 13th @ FLC:

Speakers Chris Putnam & Maurice Foye on *Using Drones to Build 3D Models of Underground CO Gold Mines*. PLUS Poster session by graduating FLC Geoscience majors.

January 17th @ FLC: Jay

LeBeau. Title TBD.

February 21st @FLC: John

Lorenz: *Structural geology & fracture studies in the San Juan Basin*.

March 21st @ FLC: Topic is

Renewable Energy, Speaker TBD.

April 25th @ FLC: FLC

Geoscience Senior Theses.

Spring '19 Watch this space for Spring / Summer '19 Field Trip announcements (see pg. 4).



Jack has more than 10 years of experience in upstream oil and gas operations. He successfully developed the geological foundation for major acquisitions in the Denver-Julesburg basin as a leading member of the DJ Resources team. Mr. Rosenthal now serves as Vice President of Geoscience directing and participating in exploration, delineation and acquisition programs throughout the Rockies. These in depth evaluation projects have both delineated numerous development targets

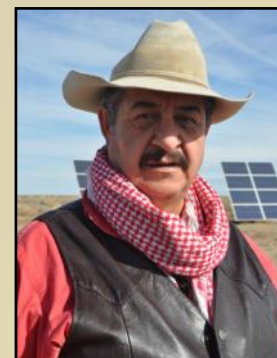
and driven recent acquisitions in the San Juan Basin."



BIOGRAPHY: Guillermo DeHerrera, Director, Jicarilla Oil and Gas Administration

Mr. DeHerrera is a native of Colorado, having been born and raised on a ranch in Conejos County. He worked in the State Attorney General's office after graduation from CU, Boulder, then became a Colorado licensed attorney in 1985. He has served as a Representative in the State Legislature and as a

Commissioner of Adams County. His background in law was put to use in business contracting in Colorado, Indiana, California and Mexico. For nine years he worked on contracts for building projects in Iraq, including oil pipelines. He has spent ten years in the oil and gas industry, working for Chevron, Gulf Oil Corporation and the Pittsburgh & Midway Coal Mining Co. For the last four years he has worked for the Jicarilla Apache Nation. Mr. DeHerrera is married to Rosemary Y. DeHerrera, who is also an attorney. They have three children.



Mancos Shale, Hwy. 160

SPE WORKSHOP: An Exploration of Horizontal Well Technologies Using Science and Advanced Evaluation Techniques for Optimizing Unconventional Well Performance

This workshop is a survey of the latest advancements and techniques in geoscience, drilling, completions and reservoir engineering technologies for horizontal wells. The workshop is presented by **GeoStar Solutions** and three of GeoStar's leading technology partners: **Field Geo Services**, **Total Depth** and **Tracerco**.

Where: DoubleTree Hotel, 501 Camino del Rio, Durango

When: Tuesday, November 6th, 10am – 5pm.

Cost: \$20 with RSVP, \$25 without

Register: <https://fourcornersgeologicalsociety.org/events/> OR <https://connect.spe.org/fourcornerspetroleum/home> .

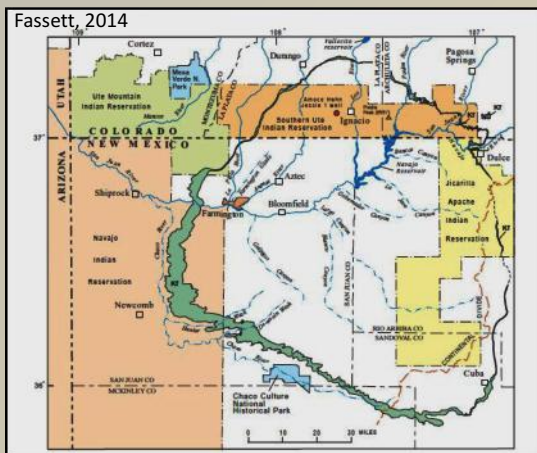
To see the workshop agenda visit the SPE website above. For more information contact K.C. Oren at kc@geostarsolutions.com (303)249-9965.



Workflows on Developing a Hydrocarbons-in-Place Model for the Mancos Oil Rim in the San Juan Basin,

Jack Rosenthal

ABSTRACT: DJR Energy has integrated experience from other Rockies Basins with a detailed geologic evaluation of the Gallup sands to identify limits of economic development in the San Juan Basin. Using a petrophysical model tailored to local formations and mineralogy allows DJR to understand complex trends in oil and gas distribution within a stacked sandstone sequence. A wide variety of data sources have influenced this method for estimating original oil-in-place and future productivity. The distribution of hydrocarbons across the southern flank of the San Juan Basin is complex, but volumes ranging from 8 to 30+ Million Barrels in place per section provide fantastic horizontal development opportunities for years to come. Lessons will still be learned about the deliverability of mapped hydrocarbons, drivers of GOR and how recovery factors will impact inter-well spacing among others. DJR Energy has not hesitated to apply similar techniques to look beyond the Gallup for economic opportunities in the San Juan Basin oil rim. Continuing to tie a detailed understanding of geology with data from new wells will lead industry towards more profitable development in the San Juan Basin.



Defining the Pay Zones - Petrophysical Type Logs for the San Juan Basin Gallup and Mancos Hydrocarbon Plays,

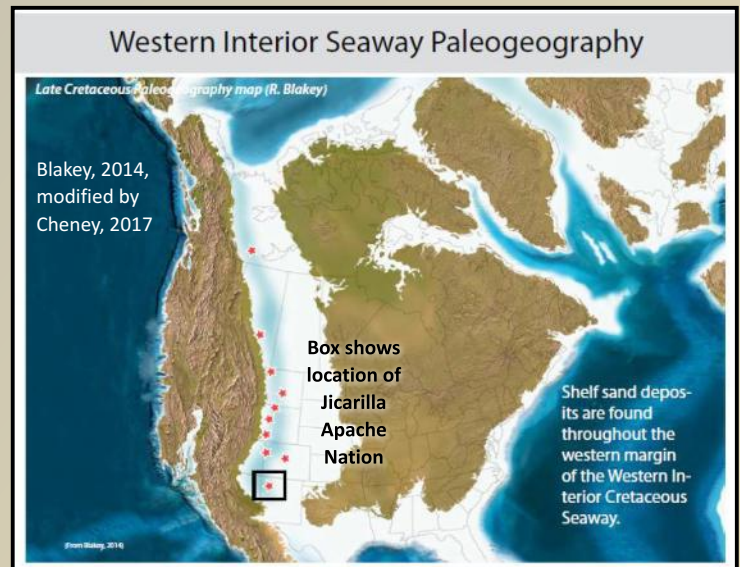
Paul Spear, formerly Logos, ConnocoPhillips

POSTER ABSTRACT: The Mancos and Gallup hydrocarbon plays within San Juan Basin have distinctly different pay criteria. This poster displays side by side examples of petrophysical type logs for two wells. One is from the southern "hybrid conventional" Gallup oil play, and the other is from the northern "true unconventional" Mancos dry gas play. Dissimilar log cutoffs and net pay flags are presented along with lithological observations which define these two distinct plays.

Oil and Gas Potential on the Jicarilla Apache Nation and Gas Export Options in the San Juan Basin,

Guillermo DeHerrera

ABSTRACT: Mr. DeHerrera's talk will cover the following points. Potential development of oil and gas resources in the Jicarilla Apache Nation compared with other basins in the US and in Iraq. Global supply and demand for San Juan Basin gas is causing "stranded gas". LNG export to Asia is a potential market for natural gas from the San Juan Basin. Other potential opportunities include sending gas to electric power plants (GTPP) in the region.



Stratigraphic Relationships of the El Vado, Tocito and Gallup Formations, Southern Mancos Oil Rim, San Juan Basin,

Sabina Kraushaar, MS, Juniper Resources

POSTER ABSTRACT: The stratigraphic relationship between the El Vado, Tocito and Gallup units within the Cretaceous Mancos Formation has been discussed in literature and toiled over in the subsurface by many geologists. These marine units are of particular interest because they all produce commercial quantities of hydrocarbons. This poster goes over the literature regarding the El Vado, Tocito and Gallup units, ties geologic tops to type logs in the southern oil rim of the San Juan Basin and presents each unit in the context of stratigraphy and present and past oil development



"PREZ SEZ" by Tim Rynott

Ladies and Gents,

Have you hugged your Frac'er today? In case you missed it, the Durango Herald (and many other sources) published an October 17th article by the Intergovernmental Panel on Climate Change (IPCC), the United Nations group charged with monitoring global warming.



(www.ipcc.ch/report/sr15/).

Not to sound alarmist (or open myself up to a backlash), but the IPCC emphatically states that global emissions need to be cut 45 percent by 2030 and virtually eliminated by 2050. The same report details the potential consequences, and it ain't pretty.

This report was written and edited by 91 scientists from 40 countries who analyzed more than 6,000 scientific studies.

In conjunction with the IPCC Report, another article recently piqued my interest. Although a bit dated, this 2016 FORBES piece states that Pennsylvania's CO2 emissions had dropped over 30% during a 10 year period due to exploitation of shale gas using fracture technology.

(www.forbes.com/sites/judeclemente/2016/04/17/fracking-and-natural-gas-have-cut-pennsylvanias-co2-emissions-30/#7f7fcfe95b67)

Pennsylvania is one of the many examples depicting the benefits of natural gas. It's a very simple equation – more natural gas equals less reliance on dirtier coal and oil.

The unfortunate reality is that it's looking more and more doubtful that renewables will replace fossil fuels quickly enough to avoid continued climate disasters. Our atmosphere is polluted. It needs fixing. (In my humble opinion).

Other energy alternatives which capitalize on hydrogen, nuclear fusion, biomass, or tides have merit, but are still years away from producing an impact. Only two immediate valid alternatives are available: Better conservation, and increased natural gas production.

Further, I found it disturbing recently that the son of an Ex-AAPG

President hesitated to join AAPG because his social media compadres might discover he was chasing nasty fossil fuels for a living. Let's see, we need natural gas production (*when properly regulated*) to HELP Mother Earth, but a significant percentage of the population thinks just the opposite. Ah, life in the oil patch.

As I said earlier, have you hugged your Frac'er today?

Big kudos to the organizers of the Oct 20th FCGS Fall Field trip. As you can tell by the pictures in this Newsletter, our own Dr. Kim Gerhardt put together a great expedition with a fine brew of fun and education. If your schedule conflicted for this trip, be on alert because our Past President and Field Trip Chairman, Jim Corken, will be cook'n up something special for next year (see below).

As for this month's meeting.....Wow, did Sabina Kraushaar smack a home run. Guillermo DeHerrera of Jicarilla Oil & Gas and Jack Rosenthal (VP of Geoscience) at DJ Resources will provide valuable insights into the San Juan Basin. As a bonus, we'll have some must see poster sessions regarding the SJB preceding the talk. [Reminder: This meeting starts at 11:00]

It's important to note that even though the number of FCGS members in the Farmington/Aztec area has decreased over the years, this demographic is still a vital component of our Society. We had an excellent turnout last November for a San Juan Basin talk in Farmington, and if this trend continues, we'd be very inclined to make this a new tradition. For the Farmington/Aztec members reading this, thanks very much for your participation next Thursday and we encourage you to bring a friend or two.

Rock on.....Tim

PS – Save the date of Dec 8th for a joint Christmas party with the Durango Petroleum Club, 4Corners Landmen and Engineers at the Irish Embassy. Last year's combined party was a hoot, and we expect the same for this year.

FIELD TRIP COMMITTEE NEWS

The Field Trip Committee is considering potential destinations for the spring and summer of 2019. Possibilities include "Geology of the Bluff, UT Area", "Geologic Hazards in SW Colorado" and "Return to the San Juan Basin: the Gallup Sandstone", as well as several other ideas.

Are you interested in helping to organize one of these trips? Please contact Past-President and Chair, Jim Corken through this link:

<https://fourcornersgeologicalsociety.org/about/>.

HOLIDAY PARTY DECEMBER 8th

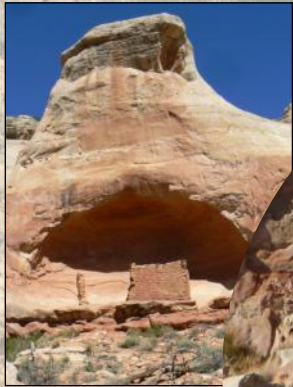
🎄 Join the Durango Petroleum Club and the 4Corners Landmen and Engineers for a holiday party on December 8th in the basement of the Irish Embassy. FCGS members & guests welcome! 🎄

OCTOBER MEETING



FCCS SAND CANYON FIELDTRIP,

OCTOBER 20TH, 2018



EVENTS, MEETINGS & COURSES (by date)

GEOLOGICAL SOCIETY OF AMERICA 130th ANNUAL MEETING: Indianapolis, ID, November 4-7th. For more information go to: <https://community.geosociety.org/gsa2018/home> .

DENVER MINING CLUB MONDAY MEETINGS: Sheridan, CO. November 5. Angus Rockett, CSM, "Overview of the Department of Metallurgical and Materials Engineering. More info at <http://www.denverminingclub.org/> .

RMAG NOVEMBER LUNCHEON: Denver CO, November 7th . Maggiano's Little Italy - 500 16th Street Mall #150, 11:30am. Speaker: Keith N. Musselman, "Snow Water Resources in a Warmer American West". For more information go to: <https://www.rmag.org/upcoming-luncheons#novlunch> .

DENVER MUSEUM OF NATURE & SCIENCE, EARTH SCIENCE COLLOQUIUM: Denver, CO. Nov. 15. Speaker: Greg Wilson (U. WA), "Mammals Inherit the Earth: How the K/Pg Mass Extinction Killed off Dinosaurs and Opened the Way for Mammals". For more information go to: <http://www.dmns.org/science/research/earth-sciences/>

COLORADO SCIENTIFIC SOCIETY NOVEMBER MEETING: Lakewood, CO. Nov. 15, "Geothermal Energy" by Jeff Winick and "Geothermal Energy Potential of Colorado by Jen Livermore. For more information go to: <http://coloscisoc.org/> .

DENVER MUSEUM OF NATURE & SCIENCE, EARTH SCIENCE COLLOQUIUM: Denver, CO. Dec. 3. Speaker: Graham Young (Manitoba Museum), "The Improbable Fossil Record of Jellyfish and Their Kin". For more information go to: <http://www.dmns.org/science/research/earth-sciences/>

RMAG DECEMBER LUNCHEON: Denver CO, December 5th. Maggiano's Little Italy - 500 16th Street Mall #150, 11:30am. Speaker: William R. Drake, "Regional Mapping of Organic Matter-Hosted Porosity: An Exploration Tool Applied to the Woodford Shale, Permian Basin". For more information go to: <https://www.rmag.org/upcoming-luncheons#declunch> .

PTTC (Petroleum Technology Transfer Council) ROCKIES TRAINING: December 7th, Golden, CO. Instructor: Bryan McDowell, Discovery Natural Resources. "Introduction to TIBCO Spotfire". For more information and to register go to: <https://www.eventbrite.com/e/introduction-to-tibco-spotfire-tickets-51792291137> .

PTTC (Petroleum Technology Transfer Council) ROCKIES TRAINING: December 13th, Rapid City, SD. Instructors: Peter Scholle and Dana Ulmer-Scholle. NM Tech. "Carbonates of the Permian Basin: From Shelf to Basin". For more information and to register go to: <https://www.eventbrite.com/e/carbonates-of-the-permian-basin-from-shelf-to-basin-tickets-51723507403> .

UNIVERSITY OF COLORADO, BENSON EARTH SCIENCES COLLOQUIUM SCHEDULE: Schedule posted at: <http://www.colorado.edu/geologicalsciences/colloquium> .

NOVEMBER 14: Dalia Kirschbaum, NASA. "Finding the Slippery Slope: "Detecting" Landslides from Space"

NOVEMBER 28: Greg Stock, Yosemite National Park. "New tools for understanding and mitigating rockfall hazards in Yosemite National Park"

DECEMBER 5: Philippe Concalves, U. Franche-Compte. "Looking for geological records of slow slip events and non-volcanic tremors in the deep crust ? Few examples from ductile shear zones in the Alps"

Colorado State University, Department of Geosciences Seminar Schedule: Schedule posted at: <https://warnercnr.colostate.edu/geosciences/geosciences-seminar-series/> .

NOVEMBER 8: Robert Anderson, CU Boulder, "The debris-covered glacier – rock glacier continuum and its geomorphic consequences".

NOVEMBER 29: Andres Aslan, Colorado Mesa University. "Origin of the Upper Colorado River System".

Colorado SCHOOL OF MINES, VAN TUYL LECTURE SERIES:

Schedule posted at: <https://geology.mines.edu/events-calendar/lectures/> . Lectures are given each Thursday from 4:00-5:00 pm in Berthoud Hall Room 241.

NOVEMBER 8: Michael Cardiff, U. of Wisconsin. Topic TBA.

NOVEMBER 15: Chunan Tang, Dalian U. of Technology. "Conceptual Model of Enhanced Geothermal System Based on Excavation Technology "

NOVEMBER 29: Kevin Bohacs, ExxonMobile Upstream Research Co. "The Vital Role of Mudstone/Shale Studies in Advancing Sequence Stratigraphy in General".

DECEMBER 6: Kaleb Scarberry. MT Tech. Mesozoic – Cenozoic Igneous Geology and Related Mineral Deposits in the Butte North 30' X 60' Quadrangle, Southwestern Montana.





FOUR CORNERS GEOLOGICAL SOCIETY

P.O. Box 1501, Durango, CO 81302

MEMBERSHIP RENEWAL or APPLICATION: June 1, 2018 to May 31, 2019



*Name: _____

*Address: _____ City: _____ State: _____ Zip: _____

*Email: _____ Phone: _____

*Employer: _____

Please Identify a Membership Category:

Active Member	\$25	Any person engaged in the practice or teaching of geology or who holds a Bachelor's Degree in geological science from a college of acceptable academic standards. Degree requirement may be waived if applicant has adequate professional experience. *Highest Degree, Type and Year: _____ *College / University: _____
Associate Member	\$25	Any person who is a graduate of a college of acceptable academic standards with major studies related to, or associated with, geology. Degree requirement may be waived if applicant has adequate professional experience. *Highest Degree, Type and Year: _____ *College / University: _____
Student Member	Free	Any undergraduate or graduate student majoring in geology at a college of acceptable academic standards. *College / University: _____ *Year expected to graduate: _____
Emeritus Member	Free	An Active Member of 65 years old or older who has been a member for 25 years including time spent in military service. *Year emeritus status was awarded: _____
Honorary Member	Free	An Active Member who has contributed distinguished service to the profession of geology and to the betterment of the FCGS. Determination is made by the FCGS Executive Committee. *Year honorarium was awarded: _____

Other Professional Interests:

** Required information for new members. Current Members, please update.*

*Please check your interests:

- ☐ Sedimentology & stratigraphy
- ☐ Structure & tectonics
- ☐ Mineralogy, petrology, geochemistry
- ☐ Igneous geology, volcanology
- ☐ Ore geology and hard rock mining
- ☐ Other mineral extraction
- ☐ Petroleum geology
- ☐ Geophysics
- ☐ Geological engineering
- ☐ Geomorphology
- ☐ Quaternary geology
- ☐ Hydrology & water resources
- ☐ Environmental geology
- ☐ Geography / GIS
- ☐ Other interest (see box)

Please either print, complete and return this form with your check for dues made payable to: "Four Corners Geological Society" and mail to the address above or go online to fourcornersgeologicalsociety.org .