

WELCOME

SIPES 47TH ANNUAL MEETING & 2010 CONVENTION

June 21-24, 2010 ★ Colorado Springs, Colorado



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SIPES 2010 CONVENTION

AT A GLANCE

MONDAY JUNE 21

8:00-9:45 a.m.
SIPES Foundation BOD
Meeting & Continental
Breakfast

8:30 a.m.-5:00 p.m.
Registration

10:00 a.m.-2:00 p.m.
SIPES BOD Meeting

10:00 a.m.-12:00 Noon
Chapter Chairmen's
Meeting

10:00 a.m.-12:00 Noon
SIPES Presidents' Council
Meeting

12:00 Noon-1:00 p.m.
Lunch for Board of
Directors, Chapter
Chairmen, & Past
Presidents

1:00-2:00 p.m.
Ethics Course

1:15-2:15 p.m.
Harrison Schmitt's
book signing

1:30-5:00 p.m.
Hospitality Suite Open

2:30-5:00 p.m.
SIPES Foundation Seminar:
*"To the Moon and
Beyond!"* by Harrison
Schmitt

6:00-8:00 p.m.
Icebreaker

TUESDAY JUNE 22

8:30 a.m.-4:30 p.m.
Registration

8:30-11:45 a.m.
Technical Sessions —
Conventional Oil

9:00 a.m.-12:00 Noon
Garden of the Gods &
Trading Post Tour

9:00 a.m.-2:00 p.m.
Whitewater River Rafting
Tour

9:00 a.m.-4:30 p.m.
Hospitality Suite Open

11:30 a.m.-4:30 p.m.
Cliff House Lunch &
Manitou Springs Shopping

12:00 Noon-1:15 p.m.
All-Convention Luncheon &
Annual Business Meeting —
Luncheon Speaker:
*"Kosmos Energy: The
Search for Oil in Offshore
West Africa"* by Phil Lowry

1:30-4:30 p.m.
Technical Sessions —
Alternate Energy

1:30-5:00 p.m.
Peterson Air and Space
Museum & Air Force
Academy Tour

6:30-9:30 p.m.
SIPES Awards Banquet

WEDNESDAY JUNE 23

8:30 a.m.-12:00 Noon
Registration

8:30 a.m.-12:00 Noon
Technical Sessions —
Case Histories

8:30 a.m.-12:30 p.m.
Florissant Fossil Beds
National Monument &
Private Quarry Tour

8:30 a.m.-1:00 p.m.
Pikes Peak Cog
Railway Tour

9:00 a.m.-4:30 p.m.
Hospitality Suite Open

1:30-4:30 p.m.
Technical Sessions —
Unconventional Reservoirs

1:30-4:30 p.m.
Foothills Jeep Tour

1:30-5:30 p.m.
Glen Eyrie Castle Tour
& Tea

6:30-9:00 p.m.
Cornerstone Group
Reception
(by invitation only)

THURSDAY JUNE 24

9:00 a.m. - 4:00 p.m.
Post-Convention Field
Trip to Cripple Creek
and Victor Mine



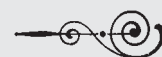
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SIPES DENVER CHAPTER

2010 CONVENTION COMMITTEE

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 George Carlstrom (assisted by Art Pansze) Technical Program Chairman
 Gary Huber, Dave Read, Jim Rogers and Steve Sonnenberg Technical Session Chairmen
 John Rakowski Post-Convention Field Trip Chairman
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in the hunt for oil,
is the library."*

—Dr. A.I. Levorsen

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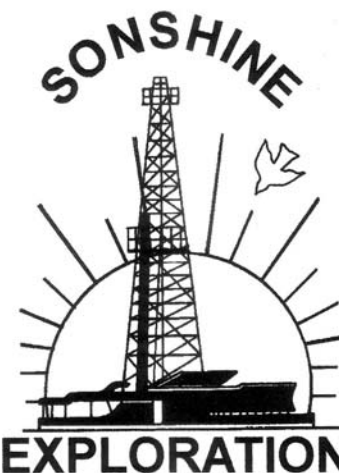
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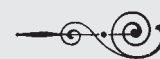
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Phone 303.831.1912
 Fax 303.832.6048

LouB@Advantage-Resources.com



CONVENTION SCHEDULE



MONDAY, JUNE 21

8:00 - 9:45 a.m.	SIPES Foundation BOD Meeting & Continental Breakfast	Gunnison
8:30 a.m. - 5:00 p.m.	Registration	Colorado/White River Gallery
10:00 a.m. - 2:00 p.m.	SIPES BOD Meeting	Gunnison
10:00 a.m. - 12:00 Noon	Chapter Chairmen's Meeting	Manitou
10:00 a.m. - 12:00 Noon	SIPES Presidents' Council Meeting	Shoshoni
12:00 Noon - 1:00 p.m.	Lunch for Board of Directors, Chapter Chairmen, & Past Presidents	Remingtons I (Entry Level)
1:00 - 2:00 p.m.	Ethics Course — <i>"The Ethos of Ethics in the Ether"</i> by Dennis Gleason, #2995	Executive Presentation Room
1:15 - 2:15 p.m.	Harrison Schmitt's Book Signing	White River Foyer
1:30 - 5:00 p.m.	Hospitality Suite Open	TBA
2:30 - 5:00 p.m.	SIPES Foundation Seminar: <i>"To the Moon and Beyond"</i> by Harrison Schmitt	White River
6:00 - 8:00 p.m.	Icebreaker	Cheyenne Courtyard (Courtyard Level)

TUESDAY, JUNE 22

8:30 a.m. - 4:30 p.m.	Registration	Colorado/White River Gallery
8:30 - 11:45 a.m.	Technical Sessions — Conventional Oil	White River
9:00 a.m. - 12:00 Noon	Garden of the Gods & Trading Post Tour	
9:00 a.m. - 2:00 p.m.	Whitewater River Rafting Tour	
9:00 a.m. - 4:30 p.m.	Hospitality Suite Open	TBA
11:30 a.m. - 4:30 p.m.	Cliff House Lunch & Manitou Springs Shopping	
12:00 Noon - 1:15 p.m.	All-Convention Luncheon & Business Meeting Luncheon Speaker: <i>"Kosmos Energy: The Search for Oil in Offshore West Africa"</i> by Phil Lowry	Remingtons I (Entry Level)
1:30 - 4:30 p.m.	Technical Sessions — Alternate Energy	White River
1:30 - 5:00 p.m.	Peterson Air and Space Museum & Air Force Academy Tour	
6:30 - 9:30 p.m.	SIPES Awards Banquet	Remingtons I (Entry Level)

WEDNESDAY, JUNE 23

8:30 a.m. - 12:00 Noon	Registration	Colorado/White River Gallery
8:30 a.m. - 12:00 Noon	Technical Sessions — Case Histories	White River
8:30 a.m. - 12:30 p.m.	Florissant Fossil Beds National Monument & Private Quarry Tour	
8:30 a.m. - 1:00 p.m.	Pikes Peak Cog Railway Tour	
9:00 a.m. - 4:30 p.m.	Hospitality Suite Open	TBA
1:30 - 4:30 p.m.	Technical Sessions — Unconventional Reservoirs	White River
1:30 - 4:30 p.m.	Foothills Jeep Tour	
1:30 - 5:30 p.m.	Glen Eyrie Castle Tour & Tea	
6:30 - 9:00 p.m.	Cornerstone Group Reception (by invitation only)	

THURSDAY, JUNE 24

9:00 a.m. - 4:00 p.m.	Post-Convention Field Trip to Cripple Creek and Victor Mine
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*Unless otherwise noted,
all meeting rooms are
on the Conference Level
of the Main Lodge.
See floor plan on page 9.*

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*Interpretation
Project Management*

Jasha Cultreri
GEOPHYSICIST
SHEAR WAVE AND INVERSION
INTERPRETATION A SPECIALTY

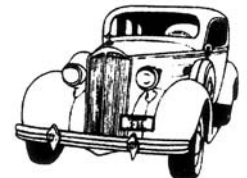
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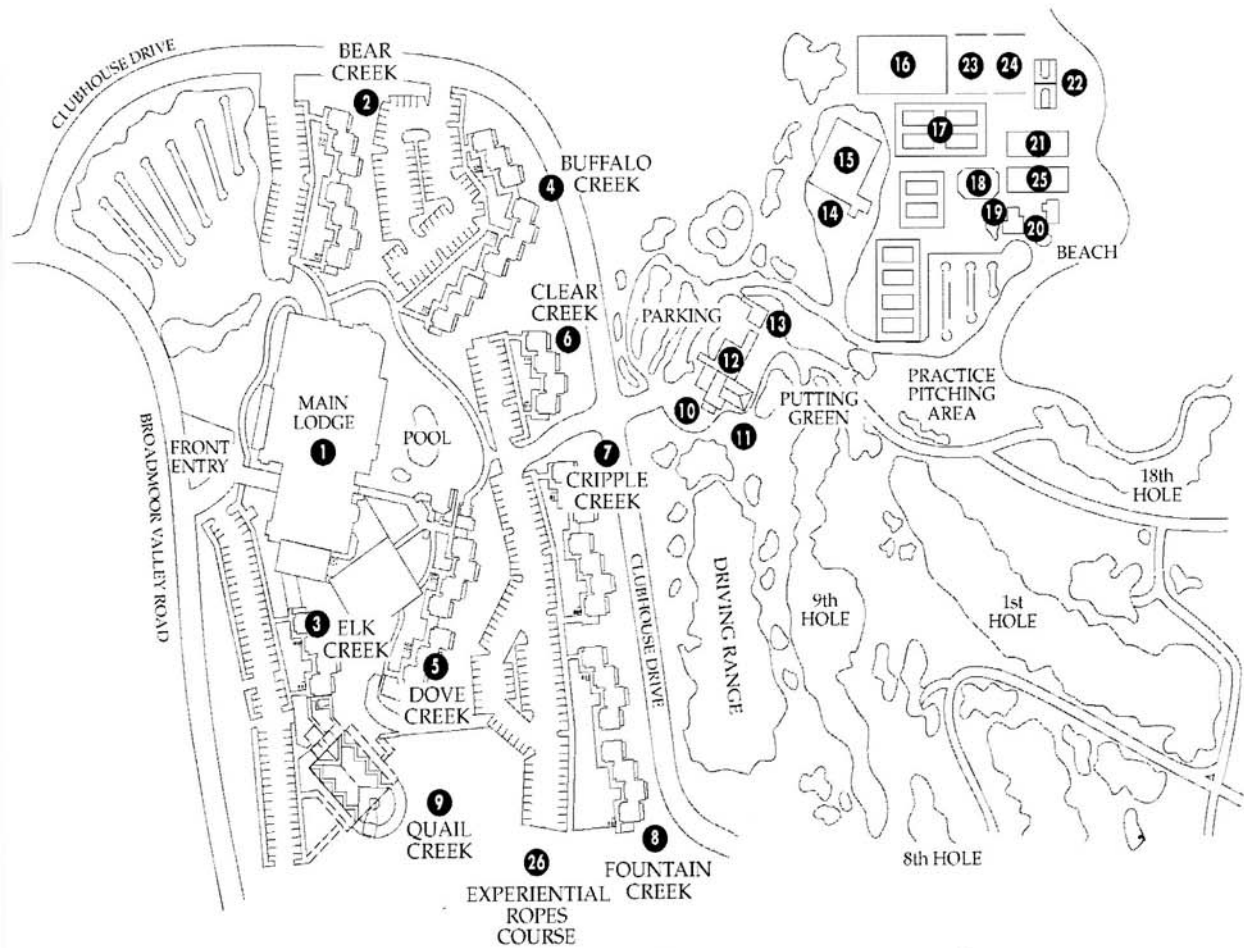
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CHEYENNE MOUNTAIN RESORT

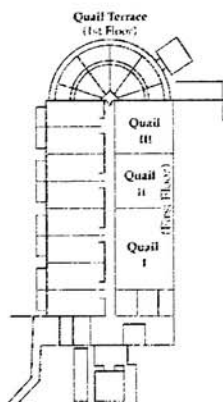
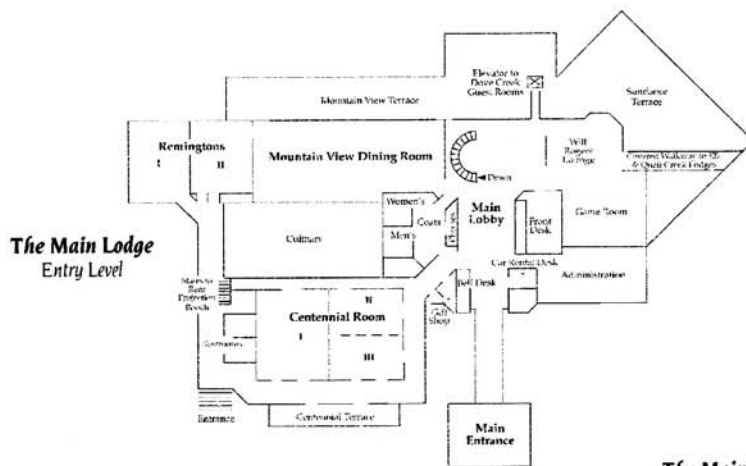
FACILITIES PLAN



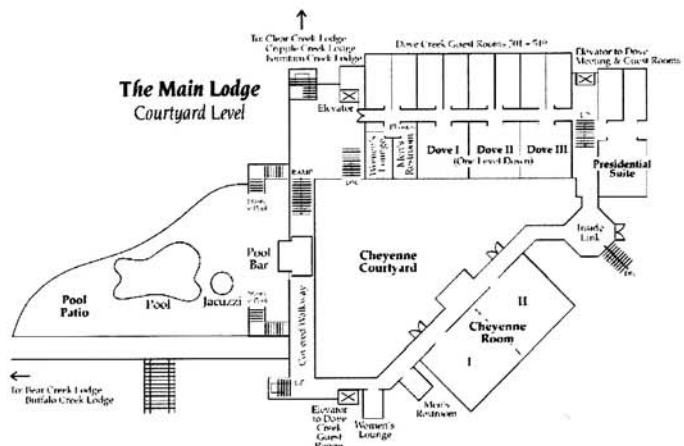
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Dining and Meeting
Facilities</p> <p>❷ Bear Creek Lodge
1st Floor-101-114
2nd Floor-201-214
3rd Floor-303-314</p> <p>❸ Elk Creek Lodge
1st Floor-115-122
2nd Floor-215-222
3rd Floor-315-322</p> <p>❹ Buffalo Creek Lodge
1st Floor-123-142
2nd Floor-223-242
3rd Floor-325-342</p> <p>❺ Dove Creek Lodge
1st Floor-401-411
2nd Floor-501-519
3rd Floor-601-619</p> | <p>❻ Clear Creek Lodge
1st Floor-157-164
2nd Floor-257-264
3rd Floor-357-364</p> <p>❼ Cripple Creek Lodge
1st Floor-165-178
2nd Floor-265-278
3rd Floor-367-378</p> <p>❽ Fountain Creek Lodge
1st Floor-179-194
2nd Floor-279-294
3rd Floor-379-394</p> <p>❾ Quail Creek Lodge
1st Floor-421-428
2nd Floor-521-536
3rd Floor-621-636</p> | <p>❿ Pineview Dining Room</p> <p>⓫ Country Club House</p> <p>⓬ Golf Pro Shop/
Lakeview</p> <p>⓭ Golf Snack Bar</p> <p>⓮ Racquet/Fitness Center</p> <p>⓯ Tennis Pro Shop</p> <p>⓰ Indoor Tennis</p> <p>⓱ Outdoor Tennis</p> <p>⓲ Indoor Swimming Pool</p> | <p>⓳ Pool Locker Room</p> <p>⓴ Adult Pool & Jacuzzi</p> <p>⓵ Outdoor Olympic Pool</p> <p>⓶ Basketball Court</p> <p>⓷ Clay Tennis Courts</p> <p>⓸ Special Events Area</p> <p>⓹ Pavilion</p> <p>⓺ Ropes Course</p> |
|---|--|--|--|

CHEYENNE MOUNTAIN RESORT

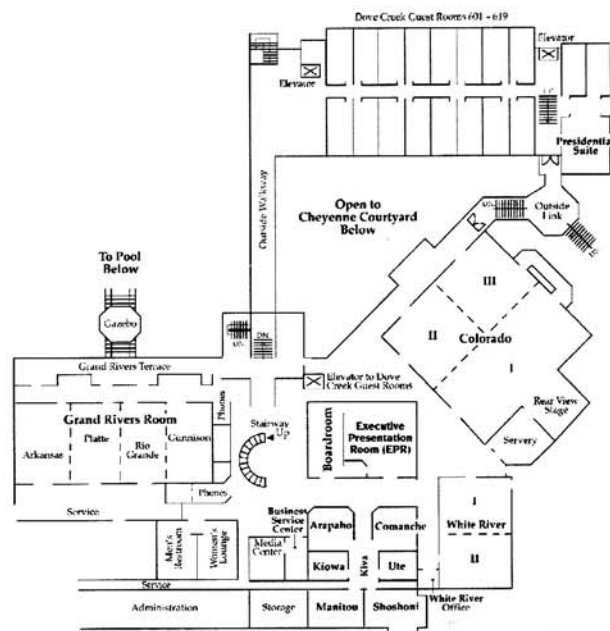
FLOOR PLAN



Quail Creek Lodge
Guest Rooms 421-636

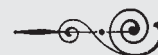


The Main Lodge Conference Level





SIPES FOUNDATION SEMINAR



MONDAY, JUNE 21

2:30 - 5:00 P.M.

CHEYENNE MOUNTAIN RESORT

Fees: Members: \$50

Spouses: \$25

Non-Members: \$65



To the Moon and Beyond!

by Dr. Harrison Schmitt

Apollo 17 Astronaut and former U.S. Senator

In December 1972, the Apollo 17 Mission became the final field trip to the Moon by human explorers. Astronauts Harrison Schmitt and Gene Cernan spent 72 hours on the lunar surface, including 22 hours outside the Lunar Module Challenger on this thirteen day mission. They returned to Earth with over 250 pounds of samples.

Harrison Schmitt was the Lunar Module Pilot for this mission, and was the only scientist and geologist to step foot on the Moon. Don't miss this opportunity to listen to the story of this mission, and to hear about all the adventure, excitement, beauty and human drama of the exploration of space. During his presentation, Dr. Schmitt will also discuss the Moon's potential role for future energy alternatives, and as a low-cost supply depot for possible expeditions to Mars and even beyond!

Harrison Hagan Schmitt, a native of Silver City, New Mexico, has the diverse experiences of a geologist, pilot, astronaut, administrator, businessman, writer, and U.S. Senator. He received his B.S. from Caltech; studied as a Fulbright Scholar in Oslo; and attended graduate school at Harvard. Geological field studies in Norway formed the basis of his Ph.D. dissertation in 1964. As a civilian, Schmitt received Air Force jet pilot wings in 1965, and Navy helicopter wings in 1967, logging more than 2100 hours of flying time.

Selected for the Scientist-Astronaut program in 1965, Schmitt organized the lunar science training for the Apollo Astronauts, represented the crews during the development of hardware and procedures for lunar surface exploration, and oversaw the final preparation of the Apollo 11 Lunar Module Descent Stage. He also served as Mission Scientist in support of the Apollo 11 mission. After training as back-up Lunar Module Pilot for Apollo 15, Schmitt flew in space as Lunar Module Pilot for Apollo 17, the last Apollo mission to the moon. On December 11, 1972, he landed in the Valley of Taurus-Littrow as the only scientist and the last of twelve men to step on the Moon.

In 1975, after two years managing NASA's Energy Program Office, Schmitt fulfilled a long-standing personal commitment by entering politics. Elected in 1976, he served a six-year term in the U.S. Senate beginning in 1977. Senator Schmitt, the only "natural scientist" in the senate since Thomas Jefferson was vice-president, worked as a member of the Senate Commerce, Banking, Appropriations, Intelligence, and Ethics Committees. In his last two years in the senate, Schmitt held the position of chairman of the Commerce Subcommittee on Science, Technology, and Space, and of the Appropriations Subcommittee on Labor, Health and Human Services, and Education. He later served on the President's Foreign Intelligence Advisory Board; the President's Commission on Ethics Law Reform; the Army Science Board; as co-chairman of the International Observer Group for the 1992 Romanian elections; and as vice chairman of the U.S. delegation to the 1992 World Administrative Radio Conference in Spain. He served as co-chair of NASA's Human Planetary Landing Systems Capabilities Road-mapping effort in 2004-05, and is on the Maguire Energy Institute's Board of Advisors.

Harrison Schmitt became chairman of the NASA Advisory Council in November 2005, and served until October 2008. He led the council's deliberations on issues related to aeronautics, audit and finance, biomedicine, exploration (human flight systems development), human capital, science, and space operations. He also consults, speaks, and writes on policy issues of the future; the science of the Moon and planets; the history of space flight and geology; space exploration; space law; climate change; and the American

Southwest. He presently is chair emeritus of The Annapolis Center (risk assessment) and is adjunct professor of engineering at the University of Wisconsin-Madison, teaching "Resources from Space." Schmitt became a consultant to the Fusion Technology Institute at the University of Wisconsin in 1986, advising on the economic geology of lunar resources, and the engineering, operational, and financial aspects of returning to the Moon.

He is on the staff of the Institute for Human and Machine Cognition of Pensacola, Florida. Current board memberships include Orbital Sciences Corporation, Edenspace Systems Corporation, and PhDx Systems, Inc. As a retired director, he continues as an emeritus member of the corporation of the Draper Laboratory. He also has served as a member of the DOE's Laboratory Operations Board. In 1997, Schmitt co-founded and became chairman of Interlune-Intermars Initiative, Inc., advancing the private sector's acquisition of lunar resources and helium-3 fusion power and clinical use of medical isotopes produced by fusion-related processes.

He is the author of *Return to the Moon* (2006 Springer-Praxis) that describes a private enterprise approach to providing lunar helium-3 fusion energy resources for use on Earth. He is the recipient of numerous awards, including honorary membership from AAPG. In 2007, Schmitt was awarded the first Eugene M. Shoemaker Memorial Award by Arizona State University, and is the first recipient of the National Space Society's Gerard K. O'Neill Memorial Space Settlement Award. He was inducted into the Astronaut Hall of Fame and the International Space Hall of Fame, and has received honorary degrees from ten U.S. and Canadian universities. In recognition of past service, the U.S. Department of State in July 2003 established the Harrison H. Schmitt Leadership Award for U.S. Fulbright Fellowship awardees. He also traveled in Europe in 2009 as a speaker and specialist for the U.S. Department of State. He recently has been awarded the 2010 inaugural Columbia Medal by the Aerospace Division of the American Society of Civil Engineers. He currently resides in Albuquerque with his wife, Teresa A. Fitzgibbon, a native of Los Alamos, New Mexico.



*This program is generously underwritten by contributions from
the SIPES Houston Chapter;*

*SIPES members David A. Eyler, #2314, Marc Maddox, #2777,
and H. Jack Naumann, Jr., #2420, of Midland, Texas;
Michael A. Pollok, #2512, of Purcell, Oklahoma; and
David L. Read, #3070, of Highlands Ranch, Colorado.*



BOOK SIGNING

From 1:15 to 2:15 p.m.,
Dr. Schmitt will be available to sign his book,
***Return to the Moon: Exploration, Enterprise,
and Energy in the Human Settlement of Space.***

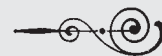
Barnes & Noble Booksellers will have
books available for purchase.

**Please note that Dr. Schmitt will only sign
his book, and no other items.**



CONVENTION ACTIVITIES

REGISTERED EVENTS



ENTRANCE TO MEETING EVENTS

Entrance to all meeting events and tours will be by convention name badge. You can purchase extra tickets for some events at the registration desk. Tickets will be required for all tours, the SIPES Foundation seminar, the awards banquet, and post-convention field trip.

ICEBREAKER

Monday, June 21

6:00-8:00 p.m.

Meet with friends and colleagues while enjoying outstanding hors d'oeuvres and drinks at the 2010 Convention Icebreaker. Each registrant will receive two complimentary drink tickets. A cash bar will also be available. **If your spouse/guest is not registered, please purchase a ticket for this event.**

ETHICS COURSE

Monday, June 21

1:00-2:00 p.m.

"The Ethos of Ethics in the Ether"
by Dennis Gleason, #2995



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HOSPITALITY ROOM

Monday, June 21, 1:30-5:00 p.m.

Tuesday, June 22, 9:00 a.m. - 4:30 p.m.

Wednesday, June 23, 9:00 a.m. - 4:30 p.m.

Welcome to Colorado Springs! Here you will find a continental breakfast in the morning and light beverages during the day, along with general information on activities for registered members and spouses/guests.

ALL-CONVENTION LUNCHEON & ANNUAL BUSINESS MEETING

Tuesday, June 22 – 12:00-1:15 p.m.

***"Kosmos Energy: The Search
for Oil in Offshore West Africa"***

by Phil Lowry, Chief Geologist & Partner
Kosmos Energy, LLC – Dallas, TX



Early in 2004, Kosmos Energy began creating a first-class exploration portfolio along the West Coast of Africa by capturing acreage positions in emerging basins and established provinces that had been overlooked or dismissed by major oil and gas companies. In mid-2007, Kosmos discovered the Jubilee Field in the deep waters offshore Ghana, one of the largest oil finds in West Africa during the last decade. This discovery was followed by three successful appraisal wells. Kosmos also discovered the nearby Odum Field, which confirmed that the company had found a new significant oil province in the region. Kosmos and its partners are developing the Jubilee Field on an accelerated schedule, targeting first oil production in late 2010.

Phil Lowry has been with Kosmos since its beginning in early 2004. He was previously with Triton Energy and ARCO working on a variety of projects in Alaska, California, the North Sea and Indonesia. He has a B.S. and M.Phil. from the University of Ulster in Northern Ireland, and a Ph.D. in geology and geophysics from LSU Baton Rouge.

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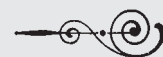
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SIPES AWARDS BANQUET



TUESDAY, JUNE 22

6:30 - 9:30 P.M.

Fee: \$90.00 per person
(Ticket purchase required)

Meet new colleagues, and renew old acquaintances at the relaxing, fun-filled SIPES Awards Banquet. In addition to musical entertainment and dancing, you'll enjoy cocktails, and an awards ceremony followed by a delicious dinner. Winning tickets will also be drawn in the SIPES Foundation's *No Hassle Raffle*. You'll enjoy this festive evening in beautiful Colorado Springs.



G. Frederick Shepherd

G. Frederick Shepherd, #27, a former Dallas Chapter member, will be posthumously awarded SIPES Honorary Membership, the Society's highest award.



Daniel L. Smith

Daniel L. Smith, #1647, of Houston, Texas will receive SIPES Honorary Membership. In the Society's forty-seven year history, this award has only been presented on twenty-one previous occasions.



Victor L. Cooper

SIPES Outstanding Service Awards will be presented to **Victor L. Cooper, #2171**, of Oklahoma City, Oklahoma and **William T. Goff III, #2068**, of Denver,



William T. Goff III

Colorado to recognize their long history of service to SIPES at the local and national levels.

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2010 CONVENTION TOURS & EVENTS

Terms: There will be no tour refunds. All tours are non-transferable. Only a limited number of tour reservations are still available. Please check with the registration desk.

TUESDAY, JUNE 22

GARDEN OF THE GODS AND TRADING POST TOUR

9:00 a.m. - 12:00 Noon — \$85.00 per person



No trip to the Colorado Springs area is complete without a stop at the Garden of the Gods, a registered natural landmark. The Garden of the Gods was dedicated as a public park in

1909, and is a 1,350-acre area filled with an abundance of plants, wildflowers and extraordinary red sandstone rock formations. You'll have an opportunity to see "Balancing Rock" or view the "Gateway Rocks" and the "Kissing Camels." One of the most photographed views in Colorado is Pikes Peak framed between the "Gateway Rocks" (See the front cover).

You will also stop at the Trading Post in the Garden of the Gods. Established in 1900, the Trading Post is constructed in the Pueblo Indian style with exterior walls decorated with Navajo sand paintings. The Trading Post is an art gallery featuring Navajo rugs, Pueblo pottery, sand paintings, T-shirts, jewelry and much more!

Tour includes round-trip bus transportation, professional tour guide, taxes, and gratuities.

WHITewater RAFTING TOUR

9:00 a.m. - 2:00 p.m. — \$250.00 per person

Enjoy a half-day of whitewater rafting in the Bighorn Sheep Canyon along the Arkansas River. You will be in awe of the spectacular mountain scenery and the adventures you'll experience while racing down the river. Be sure to wear a swimsuit, shorts, tennis shoes or water sandals, sunscreen, sunglasses and bring dry



clothes for the trip back to Cheyenne Mountain Resort. You'll enjoy a box lunch on the return bus ride. This tour is suitable for both beginning and experienced rafters. Participants must be at least 6 years old, and weigh at least 50 pounds.

Tour includes round-trip bus transportation, 1.5 to 2 hours on the water; professional raft guide; safety equipment; box lunch, bottled water and soft drinks, user fees and taxes, guide gratuities. Wet suits are available for an additional \$16.50 per person rental fee.

CLIFF HOUSE LUNCH AND MANITOU SPRINGS SHOPPING

11:30 a.m. - 4:30 p.m. — \$145.00 per person

Travel by bus to beautiful Manitou Springs and the historic Cliff House Hotel at Pikes Peak. The Cliff House has been an integral part of the life in this small



town since 1873. As you enjoy lunch in the private Solarium Room located in the Cliff House dining room, you'll experience the ambiance and gentility of the Victorian era with

fine china, linens, and crystal glassware. The dining room has received the distinguished DiRoNa Award, and has a 4 Diamond Fine Dining Rating from AAA. Following lunch you'll be taken to the Clock Tower in Manitou Springs to enjoy an afternoon of shopping on your own. There are many unique little shops to explore here. "Manitou" is the Native American word for "spirit," which describes this beautiful mountain community. Eleven named mineral springs throughout the town are fed by the snows of Pikes Peak.

Tour includes round-trip bus transportation, tour staff, lunch at the Cliff House, taxes, and gratuities.

(Continued)

PETERSON AIR AND SPACE MUSEUM & AIR FORCE ACADEMY TOUR

1:30 - 5:00 p.m. — \$120.00 per person



The mission of the Peterson Air and Space Museum is to preserve and portray the rich aviation and space history of the Peterson Air Force Base and the Colorado Springs area. The museum is located within an 8.3-acre Colorado State Historic District. Exhibits here feature the WWII Peterson Army Base, the North American Aerospace Defense

Command (NORAD), the U.S. Air Force and Army Air Defense Commands, and the U.S. Air Force Space Command. The museum's airpark collection includes sixteen aircraft and six missiles. You'll have a unique opportunity to visit this wonderful museum and learn more about American military history.

All tour participants must supply the following information in advance for this tour:

- First Name, Middle Initial, and Last Name
- Date of Birth
- Drivers License # and State Issued In

You must bring this same ID with you on the day of the tour. **Due to security requirements for this event, there will be no onsite or late registration for this tour.**

The Air Force Academy is home to over 4,000 Air Force Cadets. Guests will enjoy a guided tour through the grounds of the facility, including a visit to the unique Cadet Chapel and Visitor's Center.

Tour includes round-trip bus transportation, professional tour guide, Peterson Air and Space Museum donation, taxes, and gratuities.

WEDNESDAY, JUNE 23

PIKES PEAK COG RAILWAY TOUR

8:30 a.m. - 1:00 p.m. — \$150.00 per person

Travel by bus from Cheyenne Mountain Resort to historic Manitou Springs for a ride on a modern Swiss-made train to the summit of Pikes Peak at an elevation of 14,100 feet. The Pikes Peak Cog Railroad is the highest cog railroad in the world, and also the highest railroad in the U.S.

Passengers have spotted bighorn sheep, yellow-bellied marmots, deer, elk and the occasional bear and mountain lion.

Witness, first hand, the views that inspired Katharine Lee Bates to write the lyrics to "America the Beautiful."



The train travels at about 8 mph, giving you ample time to take photos of the beautiful scenery. Due to the cooler temperatures at the peak (up to 30 degrees cooler than Colorado Springs), it is suggested that you bring a warm jacket or sweater. Guests with a history of cardiac or respiratory problems should consult their doctor before making this ascent. There will be a box lunch for your return trip to Colorado Springs. **There will be no onsite or late registration for this tour.**

Tour includes round-trip bus transportation, Cog Railroad ticket, professional tour guide, box lunch for the return trip, taxes, and gratuities.

FLORISSANT FOSSIL BEDS NATIONAL MONUMENT AND PRIVATE QUARRY TOUR

8:30 a.m. - 12:30 p.m. — \$125.00 per person



Just west of Pikes Peak is one of the richest and most diverse fossil deposits in the world. Petrified redwood stumps that span 14 feet wide, and thousands of detailed fossils of insects and plants reveal the story of a very interesting, prehistoric

Colorado. The Florissant Fossil Beds are world-renowned, and in 1969, they were set aside as part of our national park system.

A tour guide will lead the SIPES Group down a 1/2 or 1 mile loop on a private tour that will last about an hour and a half. Then the group will stop at a private quarry where you'll have the opportunity to split and examine fossiliferous shale onsite for over an hour, with no digging required!

The Florissant Fossil Beds tour includes round-trip bus transportation, tour of Florissant Fossil Beds, private quarry fees, professional tour guide, taxes, and gratuities.

(Continued)

FOOTHILLS JEEP TOUR

1:30 - 4:30 p.m. — \$165.00 per person



Enjoy the beauty and history of Colorado Springs through a "four-wheeled" tour by Jeep. Included on the tour are: the Garden of the Gods, old railroad tunnels, and two National Historic Districts, for

starters. View Seven Falls and Helen Hunt Falls as you head into the foothills of Pikes Peak. Two thousand feet above Colorado Springs the tour will follow the old Shortline Railroad lines down through two tunnels to the Old Colorado City and Manitou Springs Historic Districts. During the ride your driver and tour guide will regale you with stories about Colorado and the West. During the summer months, the Jeep tops can be removed for unobstructed photo opportunities. Booster seats and car seats are available for an additional fee by reservation.

The Foothills Jeep Tour includes round-trip transportation, professional tour guide/driver, rain gear, taxes, and gratuities.

GLEN EYRIE CASTLE TOUR AND TEA

1:30 - 5:30 p.m. — \$140.00 per person

Nestled in the Colorado Rockies, at the foot of majestic Queen's Canyon, the Castle at Glen Eyrie is a charming location for a relaxing afternoon. You will enjoy a guided tour of the



historic home of General William Jackson Palmer, founder of Colorado Springs, and then have a tea in the Castle's Music Room where each guest will be treated to their choice of Glen Eyrie's own special house blend or an assortment of herbal teas. Tea also includes scones, clotted cream, cheese and crackers, savorys, chocolate truffles, mini quiche and sweets.

Tour includes round-trip bus transportation, private tour of Glen Eyrie Castle, English Cream Tea Service, professional tour guide, taxes, and gratuities.

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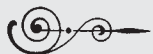


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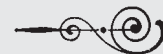
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SIPES POST-CONVENTION FIELD TRIP



THURSDAY, JUNE 24

9:00 A.M. - 4:00 P.M.

Fee: \$165.00

(Space is limited to 31 people)

CRIPPLE CREEK & VICTOR MINE FIELD TRIP

“THE CRESSON MINING OPERATION — THRIVING IN A ‘PLAYED OUT AREA’”

Conducted by Tim Brown

Exploration Manager for Cripple Creek & Victor Gold Mining Company



Gold was first discovered in 1890 followed by formation of the Mining District in the spring of 1891. Then the BOOM began! The population of the area jumped to nearly 50,000 people. After a few years, the individual miners had sold most claims to medium and large underground mining operations. The peak of production occurred around the turn of the century, but by the early 1900s ore grades weakened, labor troubles increased, water removal became a costly issue and, subsequently, production declined.

There was a slight increase in activity after the federal government raised the official gold price from \$20.67/ounce to \$35/ounce in 1934. World War II caused a complete shutdown of the mines as men and materials were concentrated on the war effort. After the war some small operations reopened but after several years with no maintenance during the war, safety problems and excessive costs forced them to close. By the early 1960s, with gold still at \$35/ounce, almost all activity stopped because production costs had gone well past the \$35 figure. In the 1980s and 1990s several small operators established minor gold production.

The Cripple Creek & Victor Gold Mining Company turned this played-out, sub-commercial area into Colorado's largest gold mining operation by using new technology to process the ore, and by taking advantage of economies of scale and realizing a gold price that was no longer artificially controlled and that now fluctuates on the world market. They are producing ore at an average recoverable grade of 0.015 ounces of gold per ton of rock, far below the grade that was produced by the early miners.

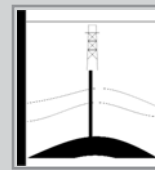
Tim Brown and his staff will summarize the history of mining in the Cripple Creek and Victor area and will discuss the rejuvenation of the Mining District by the present operations. The SIPES group will then be taken on a field trip of the operations.

CAUTIONS: Elevation for much of the trip is between 9,000-10,000 feet and weather can change rapidly from intense sunshine and 75 degrees to sleet and 40 degrees. Bring appropriate clothing. Walking will be limited as we know some interested members may not wish to walk more than 50 yards at this altitude. If you have medical problems check with your doctor for advice about this trip. We will try to keep exertion levels low for our visitors from lower elevations.

*Tour includes round-trip bus transportation, professional tour staff,
box lunch, soft drinks, water, snacks and gratuities.*

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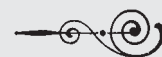


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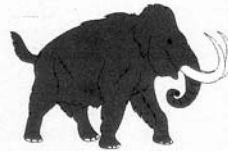
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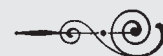
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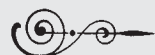
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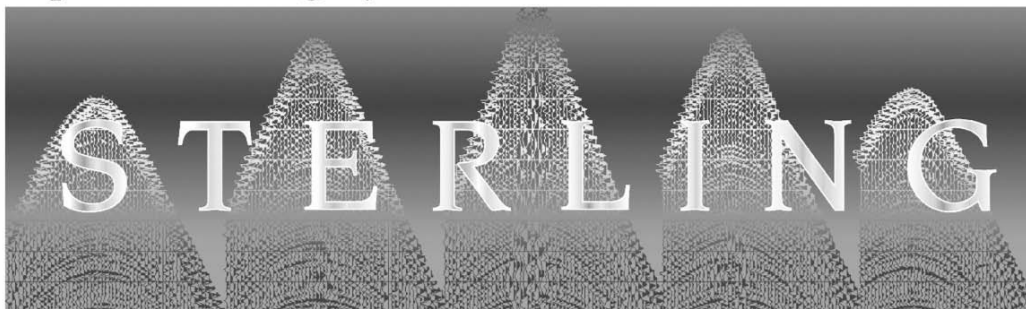
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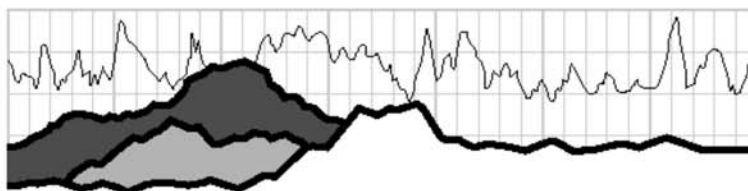
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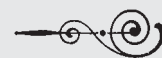
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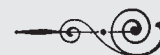
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TECHNICAL PROGRAM



TUESDAY, JUNE 22

CONVENTIONAL OIL

Steve Goolsby

“Reservoir Geology and Secondary Recovery at Kleinholz Field, Kimball County, Nebraska”

Don Hembre, #1763

“Are There Any More Lyons Oil Fields to be Found in the Denver Basin?”

Ron Broadhead

“Petroleum Geologic Framework of the Tucumcari Basin, East-Central New Mexico, With a Synopsis of Recent Exploratory Activity”

Clayton Painter

“Hartzog Draw and the Shannon Sandstone: New Observations and Constraints Applied to Depositional Models”

Charlie Bartberger

“Solution-Subsidence Control on Trends and Facies Architecture of Basal-Morrow Fluvial Valleys, Southwest Kansas”

ALTERNATE ENERGY

James Graham

“Renaissance of Nuclear Energy – From Well Field and Mine Production to the Nuclear Reactor”

Lyle Johnson

“A Source of Electrical Power, Waste Water from Oil Production”

Loyd Drain

“Opportunities and Challenges Relative to the Development of Power Transmission in the West”

Dag Nummedal

“Carbon Sequestration – The Challenges for a New Industry”

Jim Burnell

“Resource Constraints on Alternative Energy Technologies”

WEDNESDAY, JUNE 23

CASE HISTORIES

George Johnson, #2724

“Southeast Lathem Field, Hartley County, Texas”

Dick Boyce

“Piñon Field Study, Implications for Texas Overthrust Natural Gas Exploration”

Mark Gregg, #2883

“Developing an Exploration Tool in a Mature Trend: A 3-D AVO Case Study in South Texas”

Sal Mazzullo

“The Lower Mississippian of the Midcontinent – Stratigraphic Architecture, Lithostratigraphy, and Petroleum Reservoirs”
Planap Award Winner at the AAPG Mid-Continent Section Meeting 2009

UNCONVENTIONAL RESERVOIRS

Dan Jarvie

“Characteristics of Successful Shale Resource Plays, North America”

Pete Stark

“U.S. Unconventional Plays – Trends and Projections”

Marv Brittenham

“‘Unconventional’ Discovery Thinking in Resource Plays: Haynesville Trend, North Louisiana”

Brian Cardott

“Application of Vitrinite Reflectance to Woodford Gas-Shale Plays in Oklahoma”

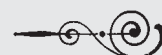
Steve Sonnenberg, #2158

“The Bakken Petroleum System Tight Oil Resource Play of the Williston Basin”

Speakers and schedule are subject to change.



TECHNICAL SESSION SPEAKERS



ABSTRACTS & BIOGRAPHIES

Charlie Bartberger — Questar Exploration and Production, Centennial, CO

“Solution-Subsidence Control on Trends and Facies Architecture of Basal-Morrow Fluvial Valleys, Southwest Kansas”



Lower-Pennsylvanian basal-Morrow valleys in southwest Kansas formed primarily by fluvial incision in response to relative lowering of sea level. Across a multi-township region in Stanton County, however, localized solution subsidence controlled geographic trends of these valleys and also facies architecture of valley-fill deposits. Evidence from wireline logs, cores, and seismic data collectively suggest that localized subsidence was caused by dissolution of anhydrite in the Mississippian St. Louis Formation, about 300 feet below the exposed Mississippian erosional surface. Subsidence-controlled variations in facies architecture of valley-fill deposits helped create complex traps for hydrocarbons in valley-fill reservoirs.

Charlie Bartberger earned a B.A. in geology from Lafayette College, and M.S. and Ph.D. degrees in geology from Syracuse University. He began his career as an exploration geologist in the onshore Gulf Coast with Shell Oil Company in 1977. In 1980 he joined Amoco Production Company where he explored northern Alaska and portions of the Rockies and mid-continent until 1999. Currently, with Questar Exploration and Production, he works in the Green River, Williston, and Powder River Basins. It was during the mid-1990s, while exploring for hydrocarbons in Mississippian St. Louis carbonates and basal-Pennsylvanian valley-fill sandstone reservoirs beneath Amoco's Hugoton acreage in southwest Kansas, that Charlie recognized solution-subsidence controls on basal-Morrow valleys.

Dick Boyce — dB, LLC Petroleum Advisors, Dallas, TX

James C. Manatt, co-author, Providence Technologies, Inc., Roswell, NM

“Piñon Field Study Implications for Texas Overthrust Natural Gas Exploration”

Piñon Field, located approximately thirty miles due south of Fort Stockton, Texas in southern Pecos County provides a comprehensive exploration analog for the West Texas Overthrust, a gas resource fairway that extends for several hundred miles along the leading edge of the Ouachita Overthrust System. Natural gas production is from multiple stacked imbricate thrust sheets of the highly fractured Caballos Novaculite (chert) and intervening Tesnus Sands at average drilling depths of 6,500 feet. Mainly developed since 2001, a statistically significant 700 wells have now been completed in at least two stacked imbricates over an area encompassing 70 square miles. Wells completed in what is now termed the "Warwick Thrust" by the field operator Sandridge Energy are yielding an average EUR of 7.5 Bcfe/well of total gas production which includes both methane (45%) and CO₂ (55%), while wells completed in the deeper "Dugout Creek Thrust" produce only minor amounts of CO₂ from these normally pressured reservoirs. The field operator has published 3P reserves for the field of 5.7 Tcf of recoverable gas.



The hydrocarbons in Piñon are primarily dry gas with no significant liquids found in the system. Wells also produce limited water which serves to enhance the overall recovery factor. It is estimated that Piñon has 150-200 Bcfe per square mile of original gas in place over a thickness ranging from 200-2,000 feet thick. Reservoir volume is comprised of highly fractured brittle cherts that exhibit both extensive micro fracturing and tectonically induced mega fractures. Wells are typically completed vertical with relatively small fracs.

The concern for production of CO₂ combined with limited infrastructure for CO₂ gas processing has historically limited the development of this play. We propose that the emplacement of CO₂ within the Caballos reservoirs is most likely controlled by the presence of a limited number of thrust faults that intersect the deeper Paleozoic platform carbonates. The high level of thermal maturation in the underlying Paleozoic limestones has introduced high concentrations of CO₂ into those hydrocarbon systems. Thrust faults can provide a connection to these sources of highly concentrated CO₂ and subsequent gas migration along these faults may provide the explanation of why some Caballos intervals produce CO₂ while other intervals on the same feature produce only methane gas. This situation is observed on the western margin of Piñon Field. Our study indicates that no significant CO₂ in thrust reservoirs has been

produced east of Piñon Field. This is significant because, contrary to some publications, modern seismic suggests the trend continues well beyond the currently proven extents. Modern seismic also enables mapping of thrust faults that intersect the Paleozoics as a way to predict where the thrust reservoirs might be CO₂ charged.

SandRidge and marketing partner Occidental Petroleum are currently building the Century CO₂ gas processing facility that upon completion will handle an additional 1.15 Bcf/day. Phase I of that facility is scheduled to be online in Q-3 2010 and when fully online in 2011 will boost the daily net methane production from Piñon Field to 290 MMcf/day. SandRidge reports completion of the interpretation of 1,300 square miles of 3D seismic most of which is located east of Piñon Field and identifies a number of significant exploration prospects that are scheduled to be drilled during 2010. The results of these exploration wells may again begin to increase drilling momentum in this highly prospective play.

Dick Boyce, originally from Carlsbad, New Mexico graduated from the Colorado School of Mines in 1979 with a B.S. in geophysical engineering. He began his exploration career with The Superior Oil Company in Houston, Texas as staff geophysicist, later working in Midland as an explorationist. He then worked for Conquest Exploration in Midland, Texas in 1983 as a senior geophysicist, and later joined Hunt Oil Company in Midland in 1986. He was transferred to Hunt's corporate office in Dallas in 1989 serving initially as chief geophysicist and later as exploration manager for Yemen Hunt Oil Company from 1992 to 1994. He began his independent career in Dallas as a geophysical consultant and petroleum advisor in 1996. He is a principal of dB, LLC Petroleum Advisors located in Dallas, Texas.

Marvin Brittenham — EnCana Oil & Gas (USA), Inc., Parker, CO

“‘Unconventional’ Discovery Thinking in Resource Plays:

Haynesville Trend, North Louisiana”



EnCana's strategy for U.S. growth was focused by the New Ventures Team, led by Marv Brittenham, first toward the Gulf Coast Jurassic Trend. This strategy culminated in the acquisition of Tom Brown Inc. in 2004, leading to formation of the Mid-Continent Business Unit in Dallas. Its East Texas team devised a strategy to explore the Jurassic sequence off the East Texas west shelf productive trend into an expanded shelf slope to basin sequence. This play has since evolved to the "Deep Bossier" Sandstone Play and resulted in the discovery and development of John Amoruso Field. (SIPES Member, #335).

Using similar unconventional thinking and entry strategies on a broader scale, EnCana acquired significant additional positions in the Jurassic Trend. Closely following the Amoruso success, in late 2005 and early 2006 EnCana drilled the discovery wells in Red River Parish, Louisiana for the Haynesville gas shale play. Notably, EnCana also recognized significant Bossier shale pay in that area. Although not widely known to industry prior to 2008 the Haynesville Play already has shifted gas shale paradigms for depth (up to 14,000 feet) pressure (up to 12,500 PSI) well productive rates (20-30 MMcf/d) and for recoverable resource size (250 Tcfg).

For three decades industry, academic and governmental views for natural gas production decline provided doom and gloom scenarios for U.S. supply. It now appears that a new trend, Haynesville, has been discovered that is potentially the largest continuous gas deposit in North America. As well, with John Amoruso Field, a new play has been established with world class productive wells. Both required unconventional discovery thinking and considerable evolution of thought beyond discovery.

Discovery thinking for resource plays requires a global view of the petroleum system. All of the primary lithologies of the Jurassic sequence are potential reservoirs — even the shale/source. Deep basin over-pressured mature gas cells provide the primary setting for Jurassic gas resource trends. Economics are very robust where there is sufficient scale, repeatability and low geologic risk for gas manufacturing processes.

Currently with EnCana Oil & Gas (USA) Inc., **Marv Brittenham** is responsible for creating growth through new Key Resource Plays within the lower 48 onshore. Marv describes this position as the perfect culmination of a 40-year career exploiting tight gas reservoirs throughout onshore USA. The present focus at EnCana is expansion of positions within the large key U.S. gas shale plays, testing their technical attributes and determining their economic viability. EnCana's discoveries within Haynesville/ Bossier gas shale and Deep Bossier sandstone resource plays in the Gulf Coast Jurassic Trend are now a focus of intense development in Texas and North Louisiana.

**Ron Broadhead — New Mexico Bureau of Geology and Mineral Resources
Socorro, NM**

*“Petroleum Geologic Framework of the Tucumcari Basin, East-Central New Mexico,
With a Synopsis of Recent Exploratory Activity”*



The Tucumcari Basin of east-central New Mexico is an asymmetric structural depression that existed as a depositional basin from the Atokan (Early Pennsylvanian) through the Wolfcampian (Early Permian). It is bounded on the north by the Sierra Grande uplift, on the northeast by the Bravo Dome, on the southeast by the Frio uplift and on the west by the Pedernal uplift, all Pennsylvanian tectonic elements. The deepest parts of the Tucumcari Basin are in elevator basins along the northern margin of the basin. Depth to Precambrian basement may exceed 14,000 feet in the deepest parts of these elevator basins. On the shelf areas to the south of the elevator basins, depth to Precambrian ranges from 2,000 to 5,000 feet in most places. To the south, the Sin Nombre arch separates the Tucumcari Basin from the Permian Basin.

Two stratigraphic intervals, the San Andres Formation (Permian: Leonardian) and the Pennsylvanian System, have generally been considered as having significant source rocks. Potential source-bearing strata occur at depths of 500 to 2,500 feet in the San Andres and from 5,000 feet to 14,000 feet in the Pennsylvanian.

The San Andres is a poor to marginal source rock throughout the Tucumcari Basin. Potential source facies are dark-gray limestones. Total organic carbon (TOC) levels within San Andres source facies are less than 0.5 percent throughout most of the basin, barely adequate for petroleum generation. Thermal maturity of the San Andres is also insufficient for petroleum generation throughout most of the basin.

Pennsylvanian shales are good to excellent source rocks of gas, oil, and condensate. Source facies are dark-gray to black shales and thin shaly coals. Shales in the elevator basins are thicker and have enhanced TOC levels. Within the elevator basins, the shales have TOC levels in excess of 2 percent in most places and in the 6 to 10 percent range over large areas. Shaly coals, unknown from outside the elevator basins, have TOC levels approaching 50 percent. The shale source rocks are interbedded with sandstone reservoirs that were derived predominantly from the Sierra Grande uplift. On shelf areas south of the elevator basins, significant sections of carbonates are present which are potential reservoirs.

Thermal maturity of Pennsylvanian strata is also enhanced within the elevator basins. Throughout the shelf areas, source facies are only marginally mature. Within the elevator basins, however, deeper burial resulted in enhanced thermal maturity and the Pennsylvanian source facies are within the oil and condensate windows. Exploratory drilling through the last decade has resulted in shows of high-quality gas and, most, recently, a completed gas discovery in Pennsylvanian sandstones within the Cuervo sub-basin. Presently exploration is concentrated in the Cuervo sub-basin. Other elevator basins within the Tucumcari Basin and carbonates on the southern shelf and Frio uplift have seen little or no activity.

Ron Broadhead received his B.S. in geology from New Mexico Tech and his M.S. in geology from the University of Cincinnati. He worked for Cities Service Oil Company in Tulsa and Oklahoma City and has been with the New Mexico Bureau of Geology (formerly Mines) and Mineral Resources (a Division of New Mexico Tech) since 1981 where he is presently Principal Petroleum Geologist and teaches subsurface and petroleum geology at New Mexico Tech. At the Bureau, major research projects have included the gas-productive Abo redbeds; the New Mexico petroleum source rock project; subsurface and petroleum geology of the Tucumcari and Estancia Basins; CO₂ accumulations in New Mexico; petroleum geology of the Sin Nombre and Chupadera Mesa areas; helium-rich and CO₂-rich natural gases of New Mexico and oil and gas resources at the WIPP site; and, in conjunction with the BEG, analyses of major oil reservoirs in the Permian Basin. Most recently, he has worked on the stratigraphy and petroleum geology of Mississippian strata in the Permian Basin, natural gas in north-central New Mexico, and the distribution of CO₂-rich gases in New Mexico. He has received the Monroe G. Cheney Science Award and the A.I. Levorsen Award from the Southwest Section of AAPG; the Long Service Award from the House of Delegates of AAPG; and the Distinguished Service Award from the West Texas Geological Society. He is an honorary member of the Roswell Geological Society.

Jim Burnell — Colorado Geological Survey, Denver, CO

“Resource Constraints on Alternative Energy Technologies”



The move to increase the proportion of renewable energy in the U.S. has become a hot topic in the media and in the political arena. The popular refrain is that we will use renewables to reduce our dependence on imported sources. One aspect that is overlooked, however, is that the hardware for renewable technologies is strongly dependent on minerals - mined commodities - for which the U.S. is currently dependent upon imports. The demand for these commodities by industries outside the “alternative energy” sphere will exacerbate price and supply constraints on their use.

Copper, gallium, indium, selenium, ultra-high purity silica, cadmium and tellurium are required for the dominant photovoltaic technologies. Silver and aluminum are necessary for thermal solar power technology. Zinc, vanadium, lithium, nickel, cobalt, platinum group metals (PGM), and rare earth elements (REE) are key components of power storage, hybrid vehicle, and fuel cell applications. All these materials must be mined, and most are derived from other countries.

The prices of critical and strategic metals showed a strong spike just before the recession as competition for limited supply was spurred by developing economies and by expanded applications for the metals. While price pressure has relaxed, the market for most of the materials remains strong and promises to move rapidly as economies rebound.

Sources for many of the commodities are not necessarily reliable for the U.S. For example, most of our germanium and tellurium originate in the copper belt of central Africa; China supplies the majority of our gallium and all of our indium and rare earth elements. The world's developing economies are competing aggressively for supplies to the point of restricting and eliminating exports of the raw materials. Development of “alternative energy” sources may shift our import dependence from hydrocarbons to minerals unless domestic supplies are developed.

Jim Burnell is the senior minerals geologist with the Colorado Geological Survey, responsible for metals, uranium, and industrial minerals. Jim is a Pennsylvania native who has lived in Colorado for 18 years. A Vietnam veteran, Jim received a bachelor's degree in geology from Franklin and Marshall College, a M.S. from the University of Minnesota - Duluth, and a Ph.D. from Brown University. He has been involved in teaching (Auburn University), research (Pacific Northwest National Laboratory), and worked in the fields of minerals, hazardous waste, and general geologic and management consulting and for a Native American Tribal organization in the private sector. With the State of Colorado since 1997, Jim joined the CGS in 2007.

Brian Cardott — The University of Oklahoma, Norman, OK

“Application of Vitrinite Reflectance to Woodford Gas-Shale Plays in Oklahoma”



Several dissimilar Woodford gas-shale plays across Oklahoma constitute a natural laboratory on the influence of thermal maturity to shale gas and oil production (excluding other important influences such as thickness, depth, and completion techniques). The plays span a thermal maturity range from oil window to upper gas window.

Success in the Barnett Shale gas play in Texas suggests that the highest gas rates are in the gas window (>1.4% vitrinite reflectance, VRo). Most of the Woodford Shale gas wells are >1.4%-<3% VRo in the western part of the Arkoma Basin with initial potential (IP) gas rates as high as 11.2 million cubic feet of gas per day (MMcfd). Thermal maturity in the eastern Arkoma Basin is as high as >6% VRo. A theory that gas composition dilution with CO₂ at high thermal maturities (e.g., >3.0% VRo) is untested for the Woodford Shale in the eastern Arkoma Basin.

Oil window/gas window boundary (@1.15-1.4% VRo) Woodford Shale gas plays with some oil or condensate production are on the western edge of the Arkoma Basin play (with IP gas rates <1MMcfd, although 4 wells <1.0% VRo had IP gas rates 1-2.1MMcfd) and on the Anadarko Basin shelf in western Canadian County.

Woodford Shale gas plays in the oil window include oil-producing wells in the northern part of the Ardmore Basin in southern Oklahoma and biogenic-methane-producing wells on the northeast Oklahoma shelf in Wagoner County. Two wells in the Ardmore Basin have produced >1 billion cubic feet of gas with little or no oil production from naturally fractured Woodford Shale at about 4,000 feet in depth.

Brian Cardott received a B.S. in geology from the University of Illinois at Urbana (1977) and an M.S. in geology (specialty area in coal petrology) from Southern Illinois University at Carbondale (1981). His experience includes: (1) Research assistant in the Coal Analysis Laboratory at the Illinois State Geological Survey (1977-1978); (2) Assistant

Manager of the Coal Characterization Laboratory at Southern Illinois University at Carbondale (1978-1981); and (3) Currently an organic petrologist and coal geologist at the Oklahoma Geological Survey, where he established the Organic Petrography Laboratory in 1981. His primary research involves coalbed methane, gas shales, and the petrologic characterization of coals, hydrocarbon source rocks, and solid hydrocarbons of Oklahoma.

Brian has written more than thirty articles and books on coal, coalbed methane, gas shales, unconventional energy resources, hydrocarbon source rocks, solid hydrocarbons, organic weathering, and graptolite reflectance. He is a member of The Society for Organic Petrology (serving as president from 1995-96), International Committee for Coal and Organic Petrology, AAPG (serving as president of the Energy Minerals Division, 2004-05), Geological Society of America, Oklahoma City Geological Society, and Tulsa Geological Society.

Lloyd Drain — Wyoming Infrastructure Authority, Cheyenne, WY

“Opportunities and Challenges Relative to the Development of Power Transmission in the West”



The presentation will address power transmission planning and development in the West and more specifically, Wyoming. Topics covered include:

- Regional Transmission Planning in the West
- Review of Transmission Projects in Wyoming
- Proposed Project Routing, Developer & Line Size
- Risks & Challenges Facing Transmission Developers
- Permitting & Siting Issues
- Environmental Issues
- Possible Solutions to Permitting & Siting Issues
- Governor's Objective
- Independent Line Separation Study
- Wyoming Collector System Study

Lloyd Drain is employed by Taylor & Hill, Inc. (an Engineering & Professional Placement Company) and in the position as a project consultant with the Wyoming Infrastructure Authority, he has been supporting the development of major transmission infrastructure and generation facilities in Wyoming since 2007. Currently, there are six transmission projects in various stages of development in Wyoming totaling over 10,000 MW of proposed capacity. He is a strong advocate for Wyoming's abundant resources, and more specifically wind energy; natural gas-fired generation to address the integration issue inherent with wind; and clean-coal technology.

Lloyd holds a B.S. degree in industrial engineering from Texas A&M University and a Juris Doctor degree from the University of Tulsa School of Law. Prior to becoming involved in the power industry, Lloyd had more than thirty years experience in the oil and gas industry (primarily in the natural gas sector) having worked for a number of companies including Phillips Petroleum, Rosewood Resources, TransCanada and AIG Trading.



Dennis Gleason, #2995 — Gleason Engineering, Fort Worth, TX

Ethics Course — “The Ethos of Ethics in the Ether”

Dennis Gleason will conduct a one-hour long presentation on ethics. Attendees will receive a certificate of completion.

Dennis Gleason is the president and owner of Gleason Engineering. He holds master of science degrees from the University of Missouri-Rolla, in geological engineering and petroleum engineering. He also holds a bachelor of science degree in geology from Wichita State University. His accumulated professional experience of more than 30 years includes: supervision of drilling and completion operations, oil and gas reservoir optimization studies, petrophysical evaluation and interpretation, fair market evaluation, secondary recovery evaluation, property acquisition and divestiture and business plan development.

Mr. Gleason is a registered professional engineer in the State of Texas. He is also a member of AAPG, SPE, and SIPES. He is also an associate member of AAPL.

Steve Goolsby — Lakewood, CO

*“Reservoir Geology and Secondary Recovery at Kleinholz Field,
Kimball County, Nebraska”*



The discovery of Kleinholz field in Kimball County, Nebraska, established the Wolfcampian Wykert Sandstone as an important producing reservoir in the northern Denver Basin. Cumulative production from both primary and secondary recovery in the field is 6.7 million barrels of oil. The Wykert Sandstone has reservoir characteristics that are unlike those of most other producing zones in the Denver Basin. Sandstone deposition was controlled by glacial-eustatic sea level fluctuations during the Permian. During eustatic low stands, the basin was subaerially exposed and dune complexes migrated into the Kleinholz field area. These dune complexes were then reworked by marine processes in subsequent sea level rises. This depositional pattern influenced the distribution of the producing facies, and had a major impact on the reservoir and petrophysical properties of the Wykert Sandstone. Examination of these reservoir characteristics at Kleinholz Field indicates that there is a high probability that additional Wykert Sandstone fields will be discovered in the Nebraska panhandle.

Steven Goolsby received a B.S. in geology from Stephen F. Austin State University in 1975 and a Ph.D. in geology from the Colorado School of Mines in 2007. In 1981, he cofounded Goolsby Brothers and Associates, Inc., which furnishes a diverse array of geological and petrophysical consulting services to the oil and gas industry. He is also a founding partner in Coyote Oil and Gas LLC., an exploration company that is currently active in the Rocky Mountain region. In 2009, he also joined Vecta Oil and Gas, LLC., as an exploration geologist. His current interests include oil and gas exploration and studies in projects that integrate petrophysics, geophysical log responses, geophysics, subsurface fluid attributes, and geology into the evaluation of oil and gas reservoirs.



James Graham — Nuclear Fuel Cycle Consulting, LLC, Centennial, CO

*“Renaissance of Nuclear Energy — From Well Field
and Mine Production to the Nuclear Reactor”*

New reactor building programs are getting front page space around the world as the nuclear renaissance continues to gain momentum. Behind the front page articles, the nuclear fuel cycle is working hard to address the fuel needs for the present and future. Globally, the supply side of the nuclear industry, from mining to conversion to enrichment, is preparing to stay ahead of the uranium demand forecast. To accurately evaluate the progress in growth of the nuclear fuel supply and the risks of any forecasted timelines for new facilities, it is important to fully understand each fuel cycle step. The focus of the nuclear renaissance presentation is to discuss the options available for the industry to meet their goals while dealing with the oversight burden of our government's agencies.

James Graham established and is the CEO of a consulting company to provide services to the front end of the nuclear fuel cycle based on forty years of experience in the mining and energy industries with the last twenty-six in the nuclear industry. He has been the author of numerous papers and presentations the nuclear fuel cycle including uranium, conversion and enrichment. He retired in mid 2009 after sixteen years as the CEO and president of ConverDyn, a joint venture between affiliates of Honeywell International, Inc. and General Atomics, and managed the global marketing of conversion services from Honeywell's Metropolis Facility in Metropolis, Illinois, USA. He was a former member of the Nuclear Energy Institute (NEI) Board of Directors. He has served as chairman of the Board of Governors for the World Nuclear Fuel Market (WNFM) and is the past chairman of the NEI's Nuclear Fuel Supply Forum. Mr. Graham co-chaired the World Nuclear Association's 2007 Global Nuclear Fuel Market study.

In addition, he was a senior vice president of General Atomics and responsible for the company's nuclear fuel cycle activities from 1992 until 2004. During this period he oversaw the permitting, development and start up of the Beverley Uranium Mine in South Australia. Prior to General Atomics, he held the position of COO and president of NUEXCO and NUEXCO Trading Company. Before joining NUEXCO, Mr. Graham spent nine years with the French company, TOTAL, as CEO and president of its North American uranium, coal and gold mining entities. Mr. Graham also held the positions of COO and president at General Exploration Company, a diversified energy company based in Dallas, Texas, and held senior positions at Zapata Fuels, Inc., and Texas Gulf, Inc., all in the areas of the energy industry.

Mr. Graham received his bachelor's degree in metallurgical/mining engineering in 1970 from Michigan Technological University.

Mark Gregg, #2883 — KiwiEnergy, Ltd., Houston, TX

Charles T. Bukowski, Jr., co-author, Edge Petroleum Corporation, Houston, TX

"Developing an Exploration Tool in a Mature Trend:

A 3-D AVO Case Study in South Texas"



If at first you don't succeed, try something unconventional. Successful exploration for new reservoirs in mature trends often requires trying techniques unproven in the area. The mature Vicksburg play in south Texas has been heavily explored since the 1920s using subsurface geology and structural mapping based on conventional seismic data. There is a scarcity of direct hydrocarbon indicators such as bright spots that have been key to much of the success in other Tertiary formations in the region. Our initial exploration campaign with conventional 3-D seismic was disappointing. However, attention to rock properties coupled with application of a novel processing technique allowed us to develop a solution to our dilemma.

In the 1990s a large nonexclusive 3-D seismic survey was acquired in the area and led to increased exploration activity. The prime motive for the 3-D was to image the complex faulting and resulting compartmentalization of the Vicksburg. Given the mature nature of the area, typical exploration targets are moderate-potential fault blocks in productive intervals and higher-potential targets in deeper, untested sections.

Edge Petroleum and Carrizo Oil and Gas licensed a 450-mile² portion of the 3-D survey. Early work led to the identification and drilling of several Vicksburg structural traps, resulting in one commercial gas discovery, one non-commercial discovery, and three dry holes. Given the moderate potential of the prospects, a 20% success ratio meant the economics of our exploration program were marginal. Hence, we were prompted to search for an exploration tool that would help us to improve our success rate.

Two prospects drilled a few miles apart in our initial exploration campaign targeted Vicksburg sandstones at 5500-7500 feet. Our technical evaluation showed them to have analogous stratigraphy, structure, timing of trap formation, and proximity to source. Neither exhibited anomalous seismic amplitude. Drilling found the predicted reservoir facies in both. However, one was a commercial gas discovery and the other a dry hole. Perplexed and challenged by these results, we selected these two prospects as our laboratory for developing a better risk-assessment technique.

Seismic models were generated using dipole sonic data gathered in the discovery well. The models suggested that Class 2 AVO anomalies would be associated with Vicksburg gas reservoirs. A pilot reprocessing study demonstrated that known gas reservoirs generate Class 2 AVO anomalies and that seismic incident angles greater than about 26 degrees are required to observe them. It was observed that the application of conventional normal moveout resulted in improper imaging of the far offsets needed to discern the Class 2 anomaly. However, reprocessing the data utilizing nonhyperbolic moveout produced usable data at incident angles of up to 40 degrees resulting in proper stacking of the needed far offsets.

Resulting angle stacks were visualized on a workstation. Several untested AVO anomalies were identified, including stratigraphic traps. Wildcat drilling based on this effort resulted in six commercial discoveries and two dry holes, a success rate significantly higher than was achieved through conventional subsurface geology and structural mapping in this mature play.

(Information published and presented with permission from SEG. The complete version is available in the November 2000 edition of The Leading Edge.)

Mark Gregg is president and CEO of KiwiEnergy, Ltd., an independent E&P company based in Houston. Prior to founding KiwiEnergy in 2000, Mark began his career in 1981 with The Superior Oil Company, followed by Mobil Oil and Edge Petroleum, primarily in exploration roles, including several years in both Indonesia and Nigeria. Mr. Gregg has over 28 years of successful exploration experience and is responsible for numerous significant discoveries along the Gulf Coast and in Nigeria. He received his B.Sc. in geophysical engineering (1980) from the Colorado School of Mines and MBA (1988) from the Bauer College of Business, University of Houston. He is a Director of the SEG Foundation, an officer of the Houston Chapter of SIPES, and a member of SEG, AAPG, Houston Producer's Forum and IPAA. Mark and his wife Debra are active supporters of YES College Preparatory Schools and the UH Bauer College of Business.



Don Hembre, #1763 — Littleton, CO

“Are There Any More Lyons Oil Fields to be Found in the Denver Basin?”

The initial discovery of Permian Lyons sand oil pools in the Denver basin occurred during the early 1950s. The remarkably prolific Black Hollow field, discovered in 1953, and Pierce field, discovered in 1955, are still producing under secondary recovery programs. No additional significant Lyons sand pool discoveries have been made in the past fifty-five years. WHY? Perhaps the keys to future discovery lie in inherent stratigraphic factors and wrench fault relationships, as presented in this talk.

Don Hembre graduated from the University of Wisconsin (Madison) with a B.S. in geology. His work experience includes Standard of California - Western Operations, Franco-Western Oil Company, Amoco Production Company, Midwest Oil Corporation, and Lewis & Clark Exploration Company.

Dan Jarvie — Worldwide Geochemistry, LLC, Humble, TX

“Characteristics of Successful Shale Resource Plays, North America”



Shale resource plays can be either shale-gas or shale-oil. These reservoirs are typically very tight with low porosity and ultra-low permeability values in the nanodarcy range. Successful shale-gas and shale-oil plays in North America are variable in geological age, depositional sequence, organic richness, thermal maturity, kerogen type, and mineralogy among a few key parameters. One key characteristic is whether the system is a pure shale-gas system or a hybrid shale-gas where mixed lithofacies are present.

When assessing shale gas-in-place (GIP) and estimated ultimate recoverable (EUR) in order to assess the economic viability of these plays, it is important to understand the basic features of these systems. One important characteristic is gas type, i.e., whether biogenic or thermogenic, and if the latter, its thermal maturity for a specific kerogen type, organic richness, residual oil saturation, and mineralogy. Biogenic and low maturity thermogenic shale-gas systems will typically have much lower EURs than high thermal maturity shale-gas systems. To demonstrate these differences various shale-gas systems are compared including the Barnett, Fayetteville, Haynesville, New Albany, and Antrim shale-gas systems. The goal of this comparison is to identify geochemical variations in shale-gas systems yielding different production results.

Such geochemical characteristics as organic richness, generation potential, thermal maturity, residual oil saturation, type of gas, are important to understand as well as free vs. adsorbed gas, GIP and EUR, mineralogy, rock mechanical properties, porosity, permeability, and depositional sequence. A key factor from a geochemical viewpoint is accurately interpreting thermal maturity using all available data ranging from vitrinite reflectance, Rock-Eval Tmax, gas composition, and carbon isotopes to kerogen conversion and products formed at a given thermal maturity or conversion level. Geochemical risk factors can be assessed from these data if integrated and interpreted correctly.

Shale resource plays may also be oil plays and these have also proven to be successful. These plays are also quite variable also with variations in system types: (1) highly fractured shales, (2) tight, mixed lithofacies, and (3) tight shales. A comparison of Monterey, Bakken, and Barnett shale-oil systems is used to illustrate these differences. Indication of oil saturation can be derived using a geochemical proxy indicative of producible oil.

Dan Jarvie is an analytical and interpretive organic geochemist. He has studied or been involved in evaluation of conventional petroleum systems around the world, but is most noted for his ongoing work in unconventional shale-gas exploration particularly the Barnett Shale of the Fort Worth Basin, Texas. His specialties include source rock characterization especially for resource assessments, but also detailed source rock characterization for conventional petroleum systems analysis including bulk and compositional kinetic determinations, high resolution light hydrocarbon and fingerprinting analysis, and pyrolysis studies.

He founded Humble Instruments and Humble Geochemical Services in 1987, which were sold to Weatherford International in 2007. Prior to starting Humble, Dan worked for Delsi, Inc., the manufacturer of the Rock-Eval instrument and then with Wallace Dow at DGSi. Dan is now president of Worldwide Geochemistry, LLC, working as a consultant to industry. Worldwide has also established a research lab to evaluate various aspects of unconventional shale-gas and shale-oil petroleum systems as well as conventional petroleum systems.

Dan is also an adjunct professor at Texas Christian University (TCU) and a member of the Energy Institute. In his affiliation with the Energy Institute, he has initiated a research laboratory to provide routine and detailed geochemical

analysis. He also is an affiliate or adjunct professor at Oklahoma University. These associations will include specific research projects with professors and students at these institutions.

Mr. Jarvie is now working at the Institut Francais du Petrole (IFP) in Rueil-Malmaison, France as a visiting scientist for one year until May 2010. His work will focus on European shale gas systems and compositional kinetic experiments and models.

Dan earned a B.S. from the University of Notre Dame and was mentored in geochemistry by Wallace Dow and Don Baker of Rice University. He is a member of American Association of Petroleum Geologists, Rocky Mountain Association of Geologists, West Texas Geological Society, American Chemical Society-Geochemistry Division, Society of Petroleum Engineers, The Society for Organic Petrology, and European Association of Organic Geochemists.

George Johnson, #2724 — Sunshine Exploration Company, Amarillo, TX
"Southeast Lathem Field, Hartley County, Texas"



The Southeast Lathem Field is located in the Eastern Dalhart Basin of the Western part of the Texas Panhandle. The Dalhart Basin produces oil from the Brown Dolomite, Missourian Granite Wash and Des Moines Granite Wash. The Southeast Lathem Field was discovered in late spring of 2007 and oil production was found in the Des Moines Granite Wash. The discovery well, the Malcolm Bryant #1, came in initially pumping 320 bbls of 39-gravity oil and 39 bbls of water per day. The field has produced in excess of 100,000 barrels of oil to date from 5 Des Moines Granite Wash wells. Subsequently, a 3-D Seismic survey was run over 61 square miles. As a result of the 3-D Seismic survey, one new discovery has been found so far. The Frantz #3 came in the winter of 2009 pumping 175 barrels of oil and no water per day from the Missourian Granite Wash. Another, wildcat will spud in middle January of 2010.

George Johnson received his B.S. and M.S. degrees in geology from West Texas State University in 1968 and 1977. He has worked for Schlumberger Well Services; Groundwater Surveys, Inc.; Colorado Interstate Gas Company; Amarillo Oil Company; Texas Oil & Gas Corporation; and Search Drilling Company.

In 1980, he founded Sunshine Exploration Company and continues today as its president as the company explores for oil and gas. Mr. Johnson is past president, vice president and secretary of the Panhandle Geological Society. He is licensed in geology by the State of Texas, as a Certified Professional Geological Scientist. He has been a member of AAPG for thirty-seven years. He has served on SIPES National Board of Directors from 2004-08 as Director-at-Large; Vice president 2006-07; President 2007-08; SIPES Foundation Board of Directors 2005-08, President 2006-07.



Lyle Johnson — Rocky Mountain Oilfield Testing Center, Casper, WY
"A Source of Electrical Power, Waste Water from Oil Production"

Ormat Nevada Inc. and the U.S. Department of Energy (DOE) entered into a Cooperative Research and Development Agreement (CRADA) to demonstrate small scale power generation using an oilfield waste stream. The waste stream is the hot water/brine produced during the production of oil and natural gas. In many oilfields the produced fluid temperature is below 220 °F, but it may still be hot enough to be capable of generating significant electrical power for facility consumption. To verify this concept, an air cooled factory integrated, skid mounted standard design 250 kW Ormat organic Rankine cycle (ORC) power plant has been installed by the DOE's Rocky Mountain Oilfield Testing Center (RMOTC). The installation is at the Naval Petroleum Reserve No.3 (Teapot Dome Oilfield), north of Casper, Wyoming.

The ORC power unit was designed to use 40,000 bpd of 170 °F produced water from the field's Tensleep formation to vaporize the working fluid, isopentane. The projected gross power from the unit would be 180 kW (net of 132 kW). Because of the lack of sufficient cooling water for the system, the cooling system was designed as an air-cooled unit. The system was installed in August 2008 and put into service on September 2, 2008. As of February 2009, the unit has operated relatively trouble free with an on line percentage of 97 and an average output of 171 kW. During Jan-Feb 2009, the average output was 200 kW. However, the unit was operated for a period of time outside the unit limits causing damage to the generator.

The turbine-generator part of the system was removed, inspected and repaired. A new control system was also installed. During this downtime, several of the producing wells were shut down because of electrical and pump

problems. All well repairs and upgrades have been completed and the system restarted. Early data indicates that the unit is running more consistently and at a higher output. The new data from the system will be the emphasis of this presentation and paper. Also, a new program established with the DOE Geothermal Technologies Program to conduct longer term testing on this unit and a UTC unit to be installed in 2010 will be presented.

Lyle Johnson has over 35 years of experience in EOR/IOR, oil production, upgrading development, and testing. He also has extensive experience in project development and management, and development and testing of heavy oil, tar sand, oil shale, UCG and coalbed methane. As a senior project manager/engineer for RMOTC, he is responsible for planning, executing, and reporting for oil production, renewable energy, and environmental projects. Prior to RMOTC, Lyle worked for the U.S. Bureau of Mines, the Department of Energy, and the University of Wyoming Research Corp. Lyle is a licensed Professional Engineer and holds a B.S. in chemical engineering, and B.S. and M.S. degrees in petroleum engineering, all from the University of Wyoming.

S. J. Mazzullo — Wichita State University, Wichita, KS

Brian W. Wilhite, co-author, Woolsey Operating Co., Wichita, KS

“The Lower Mississippian of the Midcontinent – Stratigraphic Architecture, Lithostratigraphy, and Petroleum Reservoirs”



The Mississippian of the midcontinent, and especially in the subsurface of Kansas and northern Oklahoma, have posed stratigraphic problems in correlation (within the subsurface as well as to outcrops in adjoining states), regional sedimentary facies, and petroleum reservoir characterization for nearly a century. The origin, lithologies, and stratigraphic placement of many units in the subsurface, such as the prolific Cowley Formation, also have remained enigmatic, which has hampered effective petroleum exploration and exploitation strategies. Based on several years of outcrop study we have clarified the lithostratigraphy, regional depositional architecture, sequence stratigraphic framework, and diagenesis of Kinderhookian and Osagean rocks in SW Missouri, NW Arkansas, and NE Oklahoma. Recognition of regional versus local unconformities and anomalous systems tracts in these rocks have allowed us to recognize fundamental eustatic-tectonic controls on depositional cycles. The results of our outcrop studies have proven to readily extend into the subsurface, which allows for stringent evaluation of subsurface Mississippian rocks, presently only in Kansas, in the search for petroleum reservoirs there.

Sal Mazzullo received his B.S. and M.S. degrees in geology at Brooklyn College in New York in 1969 and 1971, respectively, and his Ph.D. in geology in 1974 from Rensselaer Polytechnic University in Troy, New York. After that, he was senior geologist at Texaco Research in Houston, Texas and then taught at the University of Texas-Permian Basin for three years. He subsequently joined Union Texas Petroleum Corp. as manager of stratigraphic exploration in 1978-1981, and then became a petroleum geological consultant in Midland, Texas until 1987. When the price of oil tanked, he became professor of carbonate sedimentology and petroleum geology at Wichita State University, where he presently resides. In addition to academic duties, he generates and sells prospects in Kansas, where he also drills his own wells.



Dag Nummedal — Colorado Energy Research Institute, Golden, CO

“Carbon Sequestration – The Challenges for a New Industry”

Carbon capture and sequestration became a serious research issue about 20 years ago, and the enormous progress that has been made since will be highlighted at the upcoming 10th International Greenhouse Gas Conference in Amsterdam this fall. Storage of CO₂ in oil fields has, of course, been going on since the start of the CO₂-EOR industry in West Texas in the late '70s. Industry knows how to do this, but the concern at the time was entirely focused on the incremental oil produced, not on the long term fate of the CO₂. Hence the research needs.

Ongoing carbon sequestration research addresses three critical issues:

- 1) Will sequestered CO₂ remain where we inject it, or will increased pressure create rock failure that could lead to rapid CO₂ release?
- 2) Do we understand how geomicrobiological processes potentially could provide added benefits from sequestered CO₂ such as, for example, increased methane production from coal?

3) Are the geochemical/mineralogical changes along the CO₂ “reactive transport path” well enough understood so we can predict reservoir changes in permeability and porosity in response to the flow of injected CO₂?

There also are serious legal and regulatory concerns, not the least of which are related to liability for safe storage over very long periods of time (centuries), and the implementation of best practices and international performance standards to ensure that there are no failures at large sequestration sites.

Dag Nummedal is currently the director of the Colorado Energy Research Institute, an institute at the Colorado School of Mines focused on broad multi-disciplinary research programs in both fossil and renewable energy. He is also the director of the Colorado Carbon Management Center, a multi-disciplinary and multi-institutional center engaged in research on geological and terrestrial carbon sequestration, as well as economic and policy analysis of different approaches to reductions in carbon emissions from global energy systems.

Prior to joining the Colorado School of Mines in 2004, Nummedal served as professor of geology and geophysics at Louisiana State University and the University of Wyoming. He also served for five years as manager of exploration and production technology at the Unocal Corporation. Dag Nummedal has served as president of SEPM and as an AAPG Distinguished Speaker.



Clayton Painter — Laramie, WY

“Hartzog Draw and the Shannon Sandstone: New Observations and Constraints Applied to Depositional Models”

The 81 Ma Shannon Sandstone, which is the reservoir in Hartzog Draw, is an important oil producer in the Powder River Basin, Wyoming; as such, it has been the focus of many stratigraphic studies. These studies have produced multiple, discordant depositional models for the Shannon Sandstone and more research is needed to resolve its origin and improve characterization of this important reservoir. This study synthesizes information gathered from additional core analysis, previously unstudied outcrops, x-ray diffraction analysis, petrographic analysis, additional geophysical data, and additional cross sections from well-logs and outcrops with published data.

Clayton Painter was born and raised in Los Alamos, New Mexico, but has also lived in New York, Maryland, Venezuela, Idaho, Colorado, and Wyoming. Since he was young he has always enjoyed the outdoors and remembers trying to figure out how his surrounding landscape was formed. He was delighted when he discovered that there was an entire science dedicated to solving that mystery. He received his B.S. in geology at Brigham Young University - Idaho. Afterwards, he researched under Randi Martinsen and received his M.S. in geology at the University of Wyoming, and is currently pursuing a Ph.D. under Dr. Barbara Carrapa at the University of Wyoming.

Professionally, he has interned at the Los Alamos National Laboratory at various times, and has also completed an internship for EnCana Oil and Gas.

Steve Sonnenberg, #2158 — Colorado School of Mines, Golden, CO

“The Bakken Petroleum System Tight Oil Resource Play of the Williston Basin”

The Devonian-Mississippian Bakken Petroleum System of the Williston Basin has been the focus of several cycles of exploration activity since the 1950s. The discovery and development of the Elm Coulee area of Montana, Parshall/Sanish area of North Dakota, and Viewfield area of Saskatchewan, Canada from 2001 to the present make the latest cycle the most significant of the cycle to date. Expansion of the play elsewhere in the Williston Basin is currently underway. This presentation will focus on the U.S. part of the Williston Basin.

The Bakken Petroleum System consists of the upper Three Forks, Bakken, and lower Lodgepole formations. The source beds for the petroleum system are upper and lower Bakken shales and the lower Lodgepole shale (locally).

In the current cycle of exploration and development, the middle member of the Bakken is being targeted with horizontal drilling and fracture stimulation of the horizontal leg. Prior cycles targeted the upper shale (Fairway trend) and lower shale, middle, and upper part of the Three Forks (Antelope Field).

The Bakken consists of three members: upper and lower organic-rich black shale (TOC's average 11%); a middle member (silty dolostone or limestone to sandstone lithology). The Bakken ranges in thickness from a wedge edge to over 140 ft. Published estimates of Bakken oil generated from the two source beds range from 10 billion barrels to



400 billion barrels. Abnormally high pressure gradients (0.5 to 0.7+ psi/ft) created by hydrocarbon generation occurs in the Bakken in areas where the source beds are considered mature. High resistivity is also associated with mature source-rocks which have generated hydrocarbons and are saturated with oil and gas.

Elm Coulee has produced in excess of 80 million barrels of oil and 58 BCF gas from over 400 horizontal wells since 2001. The field is being developed in the middle member of the Bakken using horizontal drilling and hydraulic fracture stimulation (gelled water and sand). The middle Bakken in this area is interpreted to be a dolomitized carbonate shoal complex. The reservoir is developed over a large area (450 square miles) and has relatively low porosity (8-10%) and permeability (0.05 md). Natural fracturing may contribute to production. Initial production from wells ranges from 200 to 1900 BOPD. The field is being developed on 640 and 1280 acre drilling and spacing units. The Elm Coulee area has many of the characteristics of a resource play (i.e., continuous accumulation, large areal extent, predictable, repeatable, technology driven, etc.). Estimated recovery per well is 350 to 600 MBO. Estimated ultimate recovery for the field is greater than 200 MMBO.

The Parshall/Sanish area was discovered in 2006 in the middle member and has produced over 17 million barrels of oil and 7.6 BCF gas to date from approximately 120 wells. The middle Bakken is a silty dolostone to dolomitic siltstone and can be divided into approximately 7 lithofacies. Wells are drilled on 640 and 1280 acre spacing units. Multi-stage fracture stimulations are performed on wells. Matrix porosities and permeabilities are lower than at Elm Coulee and nature fracture systems are thought to play a bigger role.

Bakken sweet spots are related to natural fractures, abnormal pressure, and matrix permeability. The multi-stage fracture stimulation jobs performed also appear to be an important element for establishing production.

An understanding of Bakken tectonics, stratigraphy, diagenesis, and abnormal pressure may lead to the discovery of new resource play areas in the Bakken.

Stephen Sonnenberg is a professor and holds the Charles Boettcher Distinguished Chair in Petroleum Geology at the Colorado School of Mines. He specializes in sequence stratigraphy, tectonic influence on sedimentation, and petroleum geology. A native of Billings, Montana, Sonnenberg received B.S. and M.S. degrees in geology from Texas A&M University and a Ph.D. degree in geology from the Colorado School of Mines. He has over thirty years experience as a petroleum geologist. Steve has served as president of several organizations including AAPG, RMAG, and Colorado Scientific Society. He also served on the Colorado Oil and Gas Conservation Commission from 1997-2003 and was chair of the Commission from 1999-2003. He is the recipient of the Young Alumnus Award, Outstanding Alumnus Award, and Mines Medal from the Colorado School of Mines, Distinguished Achievement Medal from Texas A&M University, distinguished service awards from AAPG and RMAG, and honorary membership awards from AAPG, RMAG and the Colorado Scientific Society.



Pete Stark — IHS Inc., Englewood, CO

“U.S. Unconventional Plays — Trends and Projections”

Pete Stark is Vice President of Industry Relations for IHS CERA in Englewood, Colorado. Prior to joining IHS in 1969, Stark was an exploration geologist for Mobil Oil.

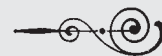
Pete has authored papers on E&P databases, hydrocarbon shows, horizontal drilling, U.S. natural gas, global energy resources, giant fields, unconventional oil and gas, and global petroleum trends.

He serves on the boards of the AAPG International Pavilion and the Independent Petroleum Association of Mountain States (IPAMS). He also serves on the AAPG Corporate Advisory Board and Resources Committee. Previously, he was chairman of the Board of Visitors for the University of Wisconsin Department of Geology and Geophysics.

Pete holds a B.S. degree in geology from the University of Oklahoma and M.S. and Ph.D. degrees in geology from the University of Wisconsin. The University of Wisconsin Department of Geology and Geophysics honored Pete's contributions to the university and profession with a Distinguished Alumni Award.



GOLFING INFORMATION & RESORT ACTIVITIES



GOLF COURSES

The Broadmoor in Colorado Springs
1 Lake Avenue
Colorado Springs, CO 80906
719-577-5790
www.broadmoor.com

Three Courses:

East Course - The East Course was one of only 12 North American and Caribbean golf courses to receive a five-star rating by Golf Digest.

Architect: Donald Ross

Green Fees: \$110, \$135, \$230

West Course - The rolling fairways and multilevel greens overlook both the city and the mountains. Architect: Donald Ross (1918) and Ronald Trent Jones Sr. (1964)
Green Fees: \$95, \$110, \$195

Mountain Course - The course features wide, forgiving fairways and large greens with beautiful vista views. Architect: Jack Nicklaus
Green Fees: \$95, \$110, \$195

Appletree Golf Club
10150 Rolling Ridge Rd.
Colorado Springs, CO 80925
719-382-3649
Green Fees: \$22 - \$40

Cherokee Ridge Golf Course
1850 Tuskegee Pl
Colorado Springs, CO 80915
719-597-2637
Green Fees: \$27

Cheyenne Mountain Resort
3225 Broadmoor Valley Rd.
Colorado Springs, CO 80906
1-719-538-4000
www.cheyennemountain.com
Architect: Pete Dye
Green Fees: \$105

Gleneagle Golf Club Inc
345 Mission Hill Way
Colorado Springs, CO 80921
719-488-0900
gleneaglegolfclub.com
Green Fees: Call for current prices

Patty Jewett Golf Course
900 East Espanola Street
Colorado Springs, CO 80907
1-719-385-5967
2 public courses

Pine Creek Golf Club
9850 Divot Trl
Colorado Springs, CO 80920
719-594-9999
Green Fees: \$40-\$59

ACTIVITIES AT CHEYENNE MOUNTAIN RESORT

- Raquetball & Tennis - indoor and clay courts. Raquetball courts also available.
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Formal outdoor heated 50m Olympic swimming pool
Adult pool (21 and older)
Indoor pool
Resort pool at Main Lodge
- Kids Splash Park and Kiddie Pool with playground, 35-acre lake for swimming, paddle-boating and fishing.
- Video games, billiards, foosball and dartboards available at Will Rogers Lounge
- Jogging, hiking, and biking paths located in the area surrounding the resort; maps available at the Concierge desk or Fitness Center.

Springs Ranch Golf Club
3525 Tutt Boulevard
Colorado Springs, CO 80922
800-485-9771 719-573-4863
2009 Green Fees: \$30/\$44
(Weekdays) \$35/\$52 (Weekends)

Valley High Golf Course
610 S. Chelton Rd.
Colorado Springs, CO 80910
719-385-6911
valleyhighgolfcourse.com
Green Fees: Call for prices

Vineyard Golf Club
3819 Janitell Rd.
Colorado Springs, CO 80906
719-226-2466
Green Fees: \$22

World Golf Sand Creek
6865 Galley Rd.
Colorado Springs, CO 80915
719-597-5489
222.worldgoldsandcreek.com
Golf Fees: 9 - holes \$10



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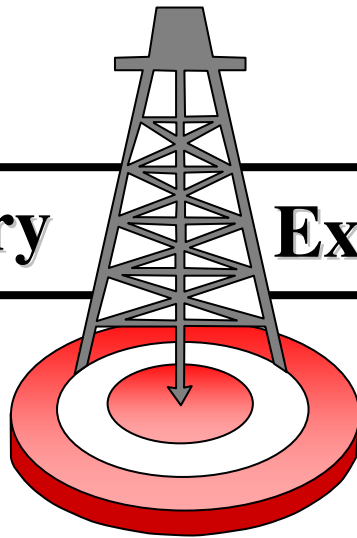
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