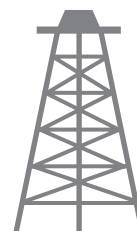




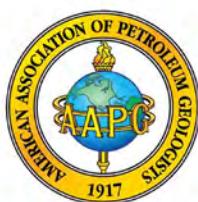
Pacific Petroleum Geology



NEWSLETTER

Pacific Section • American Association of Petroleum Geologists

January & February 2017



AAPG Pacific Section Annual Meeting
21-24 May 2017 Sheraton Anchorage Hotel

Innovating the Future: Discovery to Recovery

For more information contact the General Co-Chairs:
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 - Images (graphics, photos, and scans) must be at least 300 dpi resolution. Text should be at least 600 dpi.
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Dear Pacific Section AAPG Members,

Happy New Year! Much has happened since the last newsletter. We went through the most contentious Presidential election during my lifetime, featuring the two least-liked candidates in history. OPEC has announced a reduction in oil production quotas and Russia has agreed to go along with them. Unemployment is at its lowest level in over a decade. The stock market has been setting records almost every day, and the Fed finally raised interest rates. Meanwhile protesters have stalled, if not blocked, completion of an important oil pipeline in North Dakota. A blowout at a southern California gas-storage facility caused quite a ruckus. And some cities in California have decided to prohibit oil production on their properties. What does all this mean for our membership? I don't have a crystal ball and I really don't know. The incoming administration seems to have a favorable opinion of the domestic petroleum industry. Meanwhile, if OPEC gets its act together and no one cheats on their new output quotas, oil prices should at least stabilize if not increase slightly. That would be good news for most of us. Given OPEC's past history and the economies of some of their most important members, I wouldn't count on it. But hopefully there is enough good news that the recent period of layoffs in the petroleum industry is nearing an end and we can look forward to stability, if not growth, for our profession.



Speaking of membership, both the AAPG and Pacific Section have been losing members over the past several years, even before oil prices went south. If you're reading this newsletter, then you know the benefits that membership in your local society and PS-AAPG can offer. But you may not know the benefits to PS-AAPG and the sections that membership in the national organization provides, not the least of which is a national convention in our area every few years, which in turn typically results in substantial revenue that gets passed along to the local societies. Given the small number of petroleum geoscientists in our region relative to the Gulf Coast and other areas, it is important that as many of our colleagues as possible are members in order to keep our representation in the House of Delegates and on various committees as high as possible. So, if you know folks who are not members, you might encourage them to join.

In any event, 2017 is looking to be good for PS-AAPG. Plans for the upcoming convention in Anchorage are moving ahead. The hosting venue looks to be excellent. The call for abstracts is out and there are lots of exciting topical sessions already announced. Field trips in Alaska are always fun and informative, and an informative group of short courses are planned. Abstracts are due in mid-February and I want to encourage everyone to consider submitting one. It is shaping up to be a really exciting meeting, so I hope to see as many of you as possible there!

Robert Horton

PSAAPG President, 2016-2017



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Billy G. Winter

1926-2016

B.G. (Bill) Winter passed away peacefully at home in the late hours of Saturday, November 5th, his loving wife and caregivers at his side. Bill was born in the small community of West Texas in 1926. He graduated from West High school in 1943 and joined the U.S. Navy. Bill was a part of the "Greatest Generation" era where he served in the U.S. Naval minesweeping force in the Western Pacific and Tokyo Bay during World War II. After receiving an honorable discharge from the U.S. Navy, Bill attended and graduated from Texas College of Mines in El Paso (UTEP) with a BS degree in Geology. Bill commenced work as a petroleum geologist for Superior Oil Company in Midland Texas and later was transferred to Bakersfield California in 1951.



Fellow geologist Jack Clare introduced his sister Martha Clare to Bill and they were married in 1952. They had a wonderful life together which included two children, Phillip of San Diego, CA and Mike of Temecula, CA.

Bill spent many happy hours playing golf and cards at Stockdale Country Club. He loved to read, gardening and visit with friends and neighbors. Bill and Martha recently relocated from their beloved Bakersfield home to La Mesa California to be closer to family.

Bill was preceded in death by his parents and two brothers; his grandson Woody and great-granddaughter Saylor Jane. Bill is survived by his wife Martha, his two children Phil, Mike (Jackie), grandchildren Amy, Eric (Mandi), great-grandchild Lakelyn and numerous nieces, nephews and his pet dog Troonie. It was Bill's request that there be no funeral services.

The Winter Family would like to say thanks for the exceptional care Dad was provided by Kaiser Permanente, Grossmont Gardens Assisted Living, Gentiva Hospice and Accent Care. In lieu of flowers the family requests that donations be made to your local SPCA, Gentiva Hospice or to one's favorite charity.

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Geology and History of the Kramer Borate Mineral Deposit, Kern County, Ca.

Many of us familiar with oil and gas are familiar with wells drilled that resulted in significant discoveries and/or production. In Kern County and the San Joaquin Valley, wells like the Lakeview #1 (Midway Sunset), drilled in 1910, was the largest gusher in the U.S. Shafts and wells dug and drilled by the Elwood brothers led to the discovery of Kern River Field in 1901. In 1911, Associated Oil Company drilled Well #1 in Section 26R, the first producing well at Elk Hills.

However, some might argue that the most strategically important well ever drilled in Kern County was NOT an oil, gas, or even a water well. In fact, it was a dry hole in the western Mojave Desert.

SAY WHAT? ONE OF THE MOST IMPORTANT WELLS EVER DRILLED IN KERN COUNTY HAD NOTHING TO DO WITH PETROLEUM OR WATER?

In 1913 in the Mojave Desert, a 450-foot well was drilled by J.K. Suckow. He was attempting to find water, but the well turned out to be a dry hole. However, at 369 feet, the well did encounter an unusual gray crystalline rock. The rock turned out to be colemanite, a calcium borate, and a primary ore of the boron (Siefke, 1980). **Suckow's well encountered the western edge of the largest borate mineral deposit in the western hemisphere!** In 1925, as the Suckow ore body became defined, a more desirable hydrous sodium borate body was discovered a mile to the east. See Figure 1. (Siefke, 1980, Pemberton et.al., 1960). Mining of sodium borate began in 1927. All borate mining and processing was eventually consolidated into one operation of the Pacific Coast Borax Company (Now Rio Tinto Minerals.) The deposit is known as the Kramer Borate Deposit, or the Kramer Mining District, near Boron in eastern Kern County.

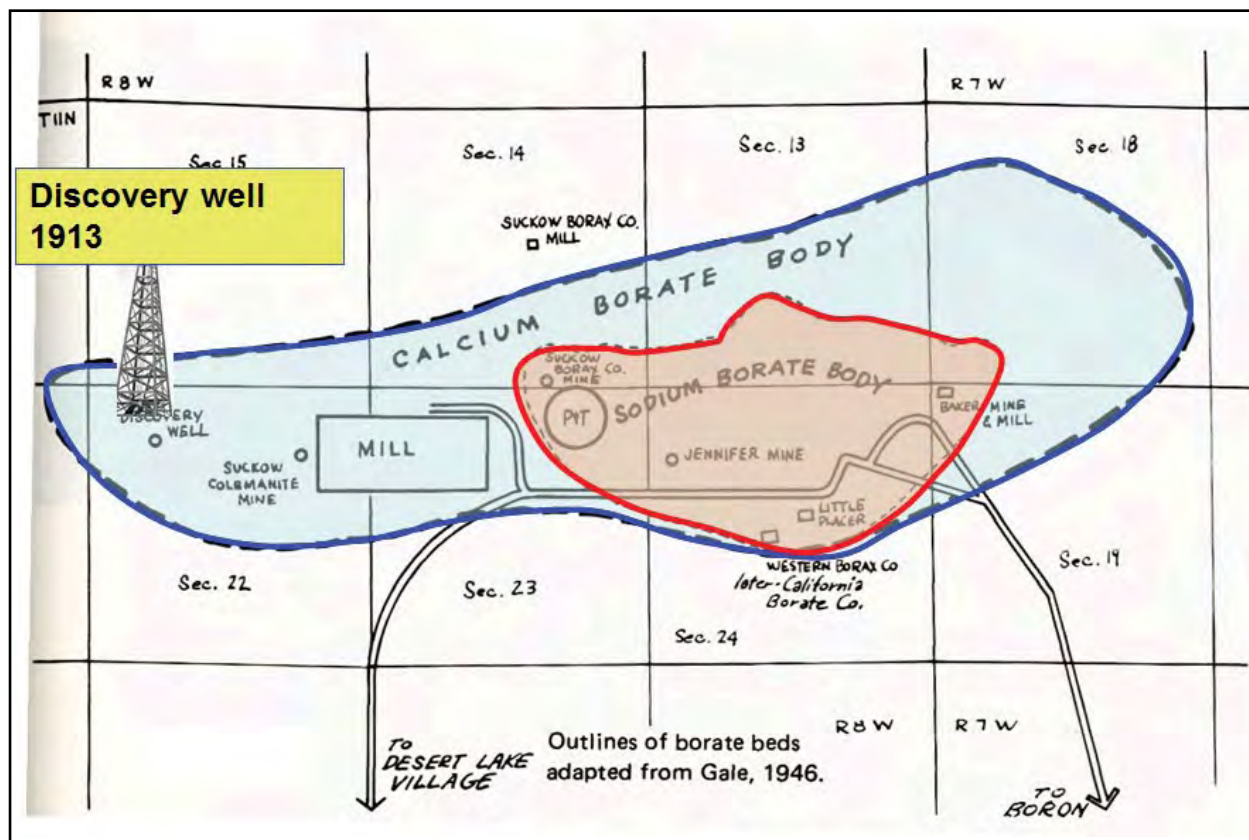


Figure 1. Map of Kramer Borate Ore Bodies.
From H.E. Pemberton et. al. 1960, "The minerals of Boron, California"

(Continued on next page)

Historically, the production of borates has been strategically important worldwide, and remains so today. Arabians used borax in gold and silversmithing in the 8th century AD. Marco Polo brought borax back to Europe from China in the 13th century. For hundreds of years, from the 13th to 17th centuries, European gold refining techniques via use of borax was a well-kept secret (U.S. Borax, Inc., 1997.) Today, borate products are used in making glass fiber insulation, glass, soaps, detergents, flame retardants, and hundreds other products (Kistler and Helvacı, 1994.)

Since mining began in the 1920's, the Kramer deposit has produced over 50% of all the borate feedstock (B_2O_3) used in the world. California borate production today also comes from smaller operations at Searles Lake in San Bernardino Co. Volumetrically, the Kramer borate production operations are rivalled only by deposits in Turkey and Russia (Liday, 1994). For the first 30 years at Boron, mining was done underground. In 1957, the complex became an open pit operation. By 2005, the pit was massive...one mile wide, 1.5 miles long, and up to 700 feet deep. See Figure 1 (Borax, 2005, Pemberton, et.al, 1960).

In the 90+ years since production began at Boron, tens of millions of tons of borate ore has been mined and processed at Boron. In 1992 and 1993, the U.S. produced just over 1 million metric tons of borate ore, virtually all mined from the Kramer District. The product value in 1992 was \$330 million and \$370 million in 1993 (Smith, 1994.) 2004 production at the mine was about three million tons of ore (Borax, 2005). Between 2008 and 2012, the boric acid and sodium borate exported each year by the United States was between 580-800 thousand metric tons. The worldwide need for borate continues to rise. Worldwide demand for B_2O_3 was expected to have been 2.0 million tons in 2014 (Crangle, Jr, 2014). Reserves at the Kramer deposit are classified; however, a huge body of calcium borate remains in the ground.

BORATE MINING HISTORY

Kramer District borate mineral production is a classic "If They Had Only Known" story. California borate mining began in the 1850's, and by the 1880's, all borate production in the state was from Death Valley. Since there was no railroad to Death Valley, borate ore was shipped 165 miles to the nearest railhead at Mojave, Ca. by the legendary 20-Mule Teams across what is now Twenty Mule Team Parkway. See Figure 2.

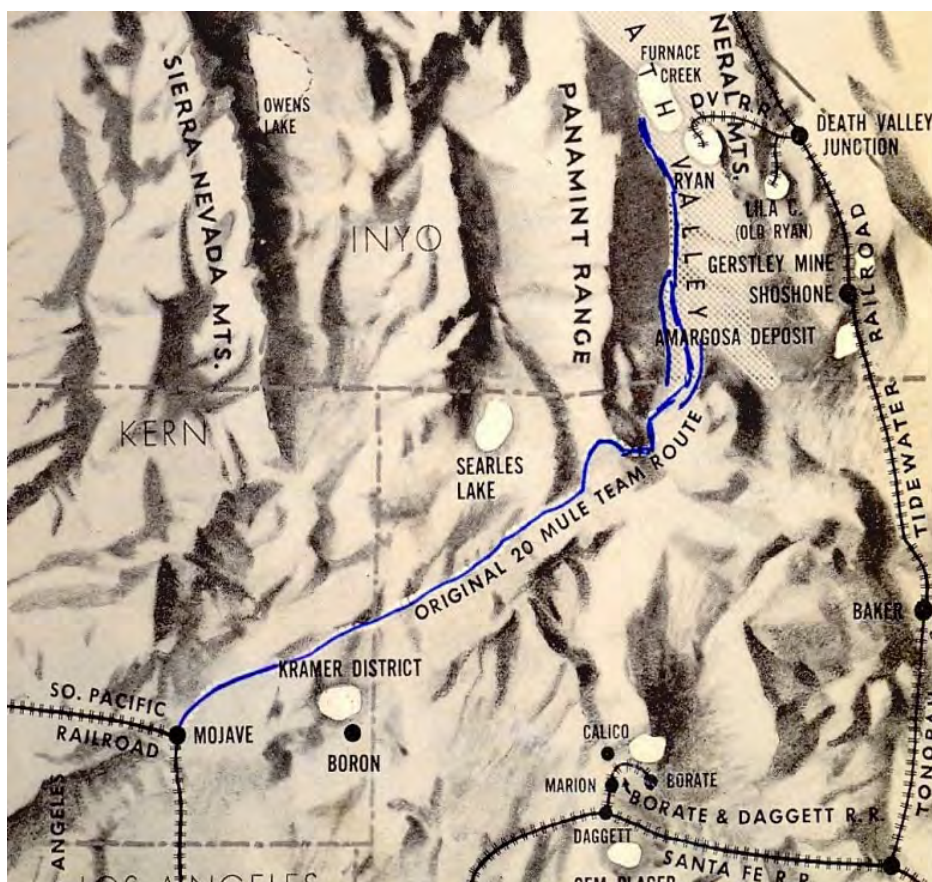


Figure 2.
Map of California
Desert Borate Mines.
From Woodman and
Rosener, "The Story
of the Pacific Coast
Borax Co.," 1951.

(Continued on next page)

Ironically, the giant Kramer Borate Deposit lies only 12 miles south of Twenty Mule Team Parkway, and the mine is only 25 miles from Mojave. If the Death Valley borate miners had only known of their proximity to the Kramer Deposit! But Kramer borate was discovered 25 years after the last Death Valley-Mojave 20 Mule Team journey.

The Mojave-Death Valley teams operated only six years, from 1883-1888 (U.S. Borax, Inc., 1997.) But after the 20 Mule Team product name was trademarked in 1894, the mule teams became a part of Americana by appearing in advertising ventures, parades, presidential inaugurations, television shows and movies, artwork, etc. (U.S. Borax, Inc. 1997.)

The Mojave-Death Valley round trip was twenty days. Each load was carried from an elevation near sea level at Death Valley to over 4000' elevation, then back below 3000' at Mojave. The teams and their handlers...a muleskinner (driver) and a swamper (cook/handyman), had an amazing safety record covering the hot, dusty, dry, rattlesnake-infested trail (U.S. Borax, Inc., 1997.) The end of 20 Mule Team transport occurred due to bankruptcy of the company owner, William T. Coleman, and discovery of other borate deposits near Barstow and in Death Valley (Woodman, and Rosener, 1951.)

GEOLOGY

The borate ore occurs in lenses of Middle Miocene shale and claystone of the Kramer beds within the Tropic Group (Siefke, 1980.) The Saddleback Basalt, dated at 18-19 million years old, marks the base of economic borate ore. The ore, shale and claystone are 16-18 million years old. Above the borate pay zone are middle Miocene arkosic sandstones. A thin veneer of Quaternary alluvium lies unconformably on top of the arkosic sandstones and covers the land surface. See Figure 3 (Siefke, 1980, Kistler and Helvacı, 1994.)

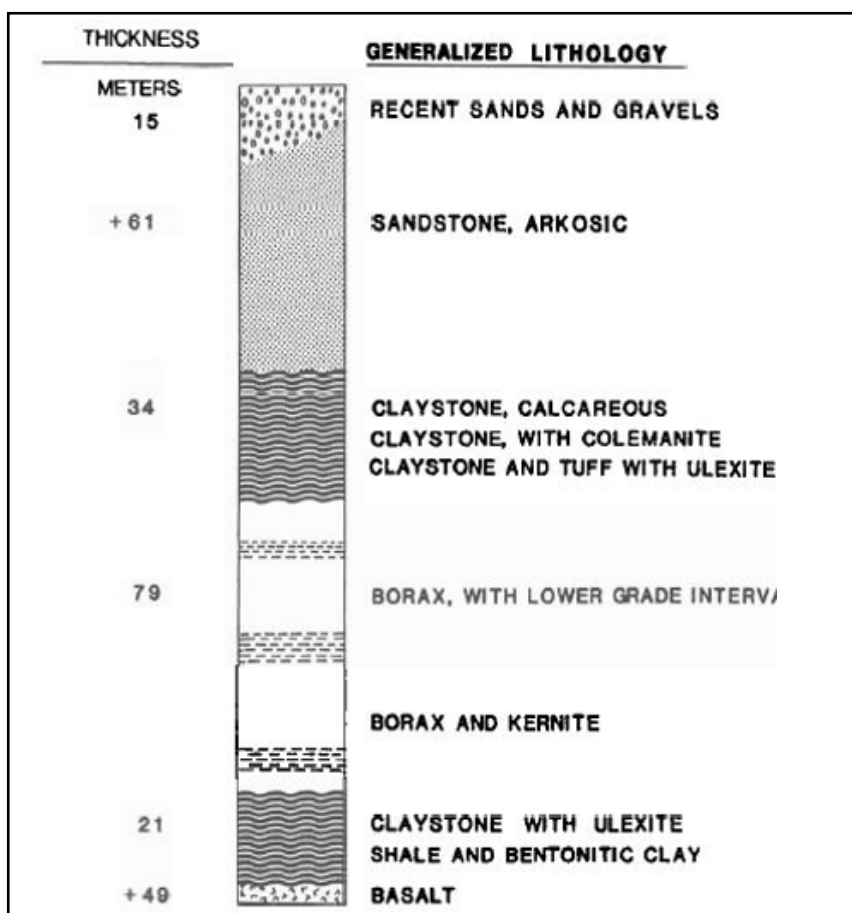


Figure 3. Generalized Kramer Deposit Stratigraphic Section. From Kistler and Helvacı, 1994.

(Continued on next page)

The borate minerals have a somewhat problematic genesis. But most workers think the minerals precipitated from hot springs adjacent to volcanoes into lacustrine/playa settings. The remnants of many Miocene volcanoes, such as Soledad Mountain and Castle Butte, still exist in the western Mojave. Hot waters dissolved boron from basalt, sediments, and quartz monzonite beneath the lacustrine sediments (Siefke, 1980.) They precipitated in the lacustrine sediments. Mineralogy of the borate deposit has changed since time of deposition. The most important sodium borates, kernite, ulexite, and tincalconite are diagenetic products...likely from the mineral borax (Siefke, 2007.) The most important calcium-rich borate, colemanite, also likely formed diagenetically.

At the southern end of the deposit, a large, down-to-the-north fault, the Western Borax Fault, bounded the lake in the early middle Miocene. After borate ore deposition, other faults developed, segregating ore bodies (Siefke, 1980.)

Kern County's contributions to American resource wealth are well-documented. But one resource that shows no signs of slowing are borate products from the Kramer Borate Mineral Deposit.

-Tim Elam

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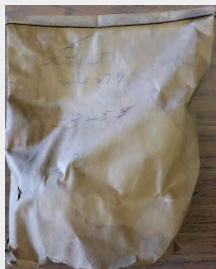


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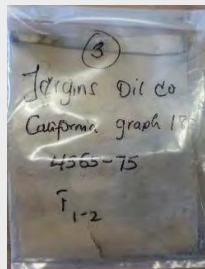
Wooden Crates with Samples

Step 2



Samples in Paper Bags from 1920's

Step 3



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Step 4



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Alaska Geological Society

Announcements coming soon

Coast Geological Society

January 17th, 2017.

United Water Conservation District will be presenting a groundwater related talk - please check the Coast Geological Society web-site for more details.

February 21st, 2017.

Speaker: Dr. Bonnie Buratti (JPL)

"The Rosetta Mission – Comet C-G Up Close"

May 5th, 2017.

Woolley Golf Tournament – The 18th annual Woolley Golf Tournament & BBQ will be held on May 5th, 2017 at Elkins Ranch Golf Course, Fillmore, CA. Please see the Coast Geological Society web-site for further details!

L.A. Basin Geological Society

January 26th, 2017.

Speaker: Katie Kovac, Jonah Energy.

"The Jonah Gas Field, Sublette County, Wyoming – Recent Developments"

February 24th, 2017.

Speaker: Ray Ingersoll, UCLA.

"Latest Developments in Reconstructing Southern California"

Northern California Geological Society

January 25th, 2017.

Speaker: Rick Wilson, California Geological Survey.

"California's Tsunami Hazard"

February 22nd, 2017.

Speaker: Tom Williams, Williams GeoAdventures.

"The Geology and Landscapes of Iceland"

Northwest Energy Association

Announcements coming soon

Sacramento Petroleum Association

February 16th, 2017.

Speaker: Roland Bain.

"Review of Drilling Activities and Highlights in the Sacramento valley for 2016".

San Joaquin Geological Society

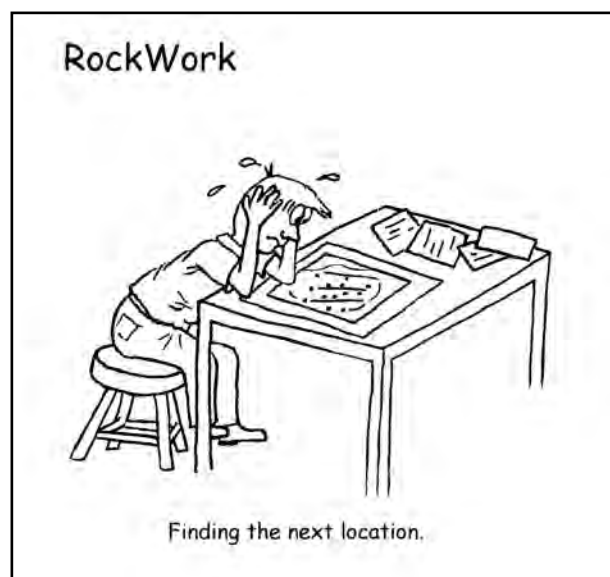
January 10th, 2017.

Speaker: Robert Mellors, Lawrence Livermore National Laboratory.

February 14th, 2017.

Speaker: Alex Simms, UCSB.

"Tectonics and the California Coast"



Alaska Geological Society
www.alaskageology.org

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eccannon@gmail.com



Luncheon meetings are held monthly September through May, usually on the third Thursday of the month, at the BP Energy Center (1014 Energy Court) from 11:30 a.m. to 1:00 p.m. The hot lunch cost is \$20 for members with reservations; \$22 for non-members with reservations; and \$25 without reservations. The box lunch cost is \$13 for members with reservations, \$15 for non-members with reservations, and \$18 without reservations. For reservations, call the AGS reservation voice mail at 907-258-9059 or contact David Hite at hiteconsult@acsalaska.net by noon on Monday before the meeting.

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Dinner meetings are held monthly September through May, on the third Tuesday of the month, at Poinsettia Pavilion, 3451 Foothill Road in Ventura. Social hour starts at 6:00 p.m., dinner is served at 7:00 p.m., and the talk starts at 8:00 p.m. The cost of dinner with reservations is \$20 (members), \$25 (non-members), or \$10 (students and K-12 teachers). For reservations, please email Eric White (secretary@coastgeologicalsociety.org), and should be made by 4:00 p.m. on the Friday before the meeting.

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Luncheon meetings are held monthly September and October; and January through June, usually on the fourth Thursday of the month, at The Grand at Willow Street Conference Centre (4101 E. Willow Street) in Long Beach. Lunch is served at 11:30 a.m., and the talk starts at 12:15 p.m. The cost is \$25 (with reservations), \$30 (without reservations), \$20 for retired members, and \$5 for students. Reservations can be made online at www.labgs.org or by contacting Graham Wilson at 562-326-5278 or GWilson@SHPI.net. Reservations must be made prior to Tuesday before the meeting.

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Vice President	Jacqueline Chavez	geojacqueline@gmail.com
Treasurer	Nicky White	nwhite@geomechanicstech.com
Secretary	Ryan Weller	ryweller@gmail.com
Scholarships	Karla Tucker	ktrk2@aol.com
Webmaster	Ivan Aburto	Ivan.Aburto@crc.com

Northern California Geological Society
www.ncgeolsoc.org

9 Bramblewood Court
Danville, CA 94506-1130

Contact: Mark Sorensen
msorensen64@earthlink.net



Evening meetings are held monthly September through May, usually on the last Wednesday of the month, at the Masonic Center (9 Altarinda Road) in Orinda. Social hour starts at 6:30 p.m., and the talk starts at 7:00 p.m. (no dinner). For reservations, contact Dan Day at danday94@pacbell.net before the meeting. Cost is \$5 per regular member; \$1 per student member; and \$1 per K-12 teachers.

(Continued on next page)

NCGS Officers:

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President-elect	open	open
Past President	Phil Reed	philecreed@yahoo.com
Treasurer	Barbara Matz	barbara.matz@cbifederaleservices.com
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Program Director	John Karachewski	cageo@sbcglobal.net
Website Editor	Mark Detterman	mdetter1@gmail.com

Northwest Energy Association

www.nwenergy.us

P. O. Box 6679

Portland, OR 97228-6679

Contact:

Jim Jackson or John Armentrout



Luncheon meetings are held monthly September through May, on the third Thursday of the month, at the Multnomah Athletic Club (1849 SW. Salmon Street) in Portland, Oregon. Meeting time is at 11:45 AM to 1:00 PM (speaker about 12:15 PM). The cost is \$25 for members and \$30 for non-members. For information or reservations email NWEnergyAssociation@gmail.com, or our Postal Box: Northwest Energy Association, P.O. Box 6679, Portland, Oregon 97228-6679.

President	Laird Thompson	lbtfrcs@gmail.com
Vice-President	Steven Pappajohn	pappajohn@narpllc.com
Past President	Bill Rodgers	bill.rodgers@stoel.com
Treasurer	Barb Portwood	bbportwood@gmail.com
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Sacramento Petroleum Association

P. O. Box 1844
Folsom, CA 95630

Contact: Jerry Reedy or Pam Ceccarelli
916-486-2643 916-439-0400



Luncheon meetings held monthly January through November, on the third Wednesday of the month. Location: Club Pheasant Restaurant in West Sacramento. The meetings starts at noon. The cost is \$16 - \$20. For information or reservations, contact Pam Ceccarelli.

President	Jerry Reedy	JWR5532@aol.com
Vice-President	Scott Hector	Scott.Hector@gmail.com
Secretary	Derek Jones	djones@gasbiz.com
Editor/Treasurer	Pam Ceccarelli	pc626@comcast.net

San Joaquin Geological Society

www.sanjoaquingeologicalsociety.org

P. O. Box 1056
Bakersfield, CA 93302

Contact: Beckie Burston
BeckieBurston@chevron.com



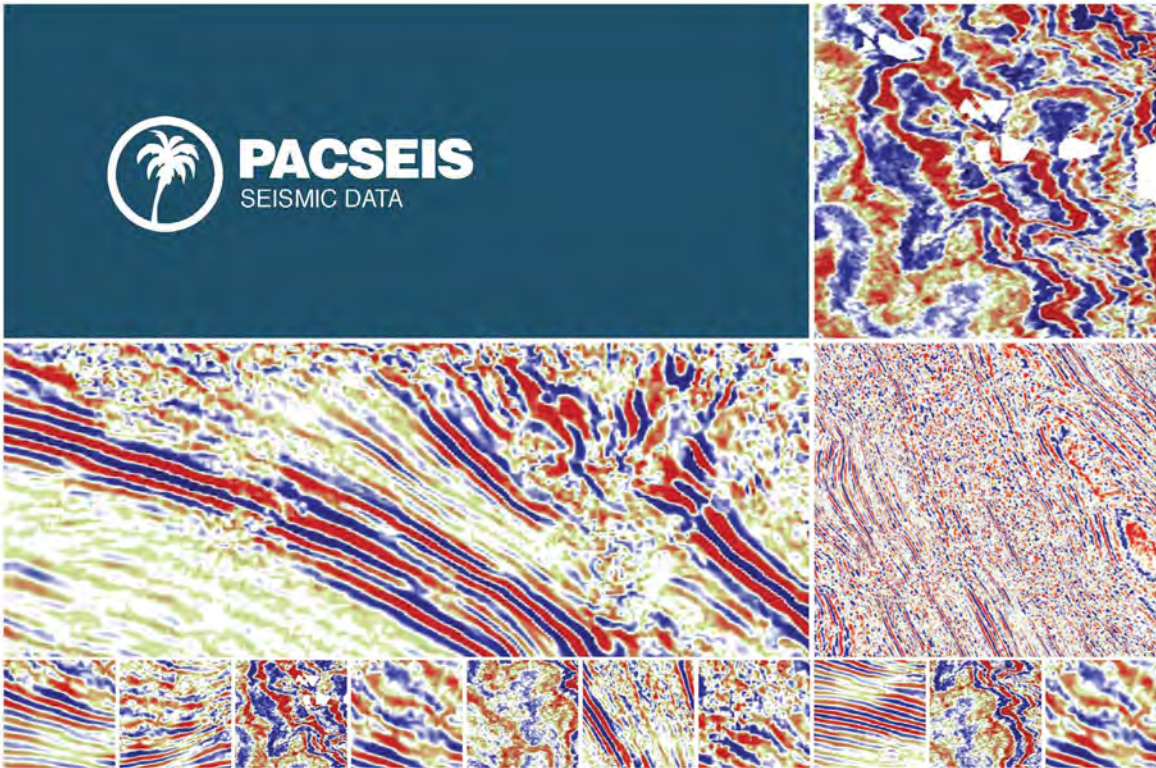
We have dinner meetings on the second Tuesday of the month at the Eagle's Lodge at 1718 17th Street, Bakersfield, CA 93302. There is an icebreaker at 6:00 p.m., dinner at 7:00 p.m., and a talk at 8:00 p.m. Dinner is \$25 for members with reservations and \$30.00 for nonmembers and members without reservations. Students may attend for free.

President	Greg Gordon	gsgordon@aeraenergy.com
Past President	Ariel Auffant	aauffant@chevron.com
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