Pacific Petroleum Geology
NEWSLETTER
Pacific Section • American Association of Petroleum Geologists
May & June 2015

Historic Development of Fracturing and Hydraulic Fracturing Part III – Going Nuclear During Peak Oil

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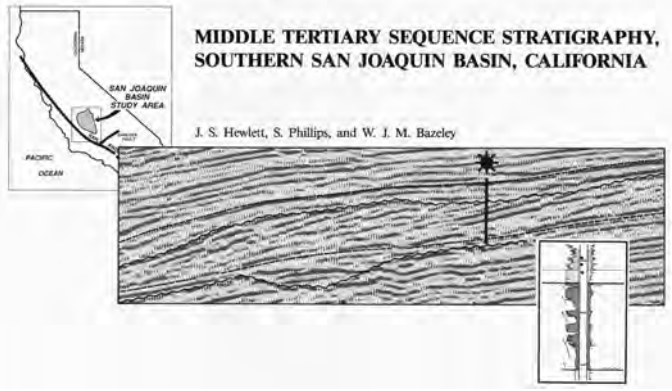
PSAAPG Has A New Publication – MP 51



"This publication follows from a technical project in the ARCO sequence stratigraphy group in Plano, Texas. This study was published as an internal company research report in 1989 in the early days of sequence stratigraphy. Twenty-five years later, the authors chose to not alter the original text and figures except to satisfy a few publication requirements – we hope the studies contribute to understanding the future exploration potential of the southern San Joaquin basin."
Originally published in-house in 1989 by ARCO: Hewlett, J. S., Phillips, S., & Bazeley, W. J. M.

This is an 11" X 24" spiral-bound book with B/W and color figures, 73 p. (1st edited version)

To purchase this publication you may go to the PSAAPG.webpage (www.psaapg.org) and download the publication ordering form or you may contact Larry Knauer (PS-AAPG Publications Chair) at larryknauer@chevron.com. Cost is $85 + S&H.

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COVER PHOTO: "Sedan Crater, was formed when a 100 kt. Explosive buried under 635 feet of desert alluvium was fired at the Nevada Test Site on July 6, 1962, displacing 12 million tons of earth. The crater is 320 feet deep and 1,280 feet in diameter. The Sedan Crater is the largest man-made crater in the United States, and is listed on the National Register of Historic Places."
Photo courtesy of National Nuclear Security Administration / Nevada Site Office.

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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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John T. Williams, Pacific Section AAPG President's Letter

Dear Energy Scientists of the Pacific Sections,

We have not even had the 2015 PSAAPG Convention and already it's a huge success. We had a final surge of registration that pushed participation to over 400. The Scarlett Belle Dinner Cruise nearly sold out and all the Luncheons were almost oversold. Thank you all.

The PSAAPG Convention Committee, lead by Joan Barminski, have done a wonderful job pulling this convention together. It was my pleasure to be guided by Joan's management style. Her leadership and temperament served our diverse group well. Together, the PSAAPG enthusiastically blended and delivered a great technical and social experience. I thank the Coast Geological Society and its president, Bob Blackmur. It was gratifying to be surrounded by an exceptional team of 'energy scientists', including the Pacific Section SEPM and the Pacific Coast Section SEG. Wow, what an accomplishment! Remember, Joan's unforgettable call, "Thrilling talks and camaraderie coming up – Cowabunga"!!!

Energy Scientists are storming the Pacific to "Catch the Energy Wave" this week so many of you will only be reading this note when you return from the conference! For those of you that get a chance to read this before or during the event, please look out for me and come and say hi. The Mandalay Beach Hotel & Resort Embassy Suites is a great venue and I am looking forward to sharing luncheons, keynote speakers, talks and posters with all of you.

Exhibitors, geologists, and sponsors, you are success makers and PSAAPG will proudly serve you this week. We appreciate all of you and the community you bring to our science. Your sponsorships and your commitment is the lifeblood for our future generations, publications, and community.

After ninety years, the PSAAPG still continues to search and discover. Since our first primordial Conference at Hotel Alexandria, Los Angeles in 1924, the Pacific Section of the American Association of Petroleum Geologists has endured and it thrives. They started a tradition; we continue that tradition, through our love for geology and another chance to "Catch the Energy Wave"!!!

Pacific Section AAPG President 2014-2015,

John T. Williams

Keith Ellsworth Green

July 23, 1929 - December 7, 2014

After a long illness, Keith Ellsworth Green peacefully passed on the afternoon of December 7, 2014, in Los Osos, California, at the age of 85.

Born July 23, 1929, at Pomona Valley Community Hospital to Ellsworth Nelson and Ione McKeen Green, both teachers, he lived his early life in La Verne, California. Keith attended Mt San Antonio Community College (Mt SAC), Whittier College, and two years of graduate studies at the University of Southern California, followed by a two-year stint in the Army. While attending Whittier College, Keith met the love of his life and future wife, Constance Lucene DeVries. On December 23, 1952, Keith and Connie were married in Connie's hometown of Mill Valley, California. Keith was extremely proud of his three children: Kevin Green of Huntington Beach, Kim Rosen of Los Osos, and Kent Green of Whittier. He will be greatly missed by his seven grandchildren: Nola and Joel Green, David and Aaron Rosen, and Andrew, Kyle and Evan Green.

Keith was on a constant quest to learn something new. In his high school years, this meant cars and anything to do with them. During and after graduate school, this meant geology, paleontology and other related fields. His professional career started in 1955 with Shell Oil in the Ventura office, specializing in micropaleontology, specifically foraminifera. The initial two years in Ventura was followed by six years in Los Angeles, another two years back in Ventura, and a final two years with Royal Dutch Shell in Houston, Texas. Upon returning to southern California in 1969, he taught geology at Whittier College for several years, and then geology and related sciences at Cypress College. In 1982, Green and Associates was founded, a micropaleontology consulting firm he founded. Additional firms founded by Keith included Green Geological and Green Environmental, providing micropaleontological supplies and environmental consulting services. Green Geological continues to this day with son Kent at the helm. Teaching continued at several Orange County colleges until 2004, when he retired at the age of 75. Being an exceptional teacher and mentor, Keith was active in and strongly supported the AAPG, Pacific Section AAPG, and the SEPM. He is loved and missed.

Keith and Connie moved to Los Osos, California in 2011, to be close to daughter Kim. Connie continues to reside in Los Osos. Keith was the second of two children, and he is survived by his sister, Kathryn Curtis of Hemet, California.

Louis F. Villanueva

March 09, 2015

On March 9th, 2015, Louis F. Villanueva passed away peacefully at the Hospice of North Idaho in Coeur d' Alene, Idaho.

Louis Villanueva served with pride in the US Navy for 3 years at the end of World War II. He then accepted a scholarship to attend Stanford University, where he received his Bachelor of Science degree in 1955. He majored in geology and minored in petroleum engineering. After graduation, he worked for the United States Geological Survey at Menlo Park, and in 1956 joined Tidewater Associated Oil Company.

Louis worked in domestic and international oil and gas exploration and production for 36 years, with the last 12 years in management. During these years, he spent time internationally in Northwest Africa, Peru, Paraguay, Argentina, and Bolivia. Within the US, his employment had him relocate to Ventura, Bakersfield, Houston, and Huntington Beach.

He moved to Santa Barbara, after retiring from Texaco in 1985, but was recruited and hired by the City of Long Beach in 1986 to work in management for 6 years as a Division Engineer. After his second retirement, he lived in Santa Barbara, Roseville, and Coeur d' Alene, Idaho.

During the years that he was actively working in his profession, Louis was a licensed and registered geologist in California and a member of the Society of Petroleum Engineers, the Stanford Geological Society, the Los Angeles Geological Society, and the Society of Economic Paleontologists and Mineralogists. He was President of the American Institute of Professional Geologists, California Section, during 1970-71, and served as President of the American Association of Petroleum Geologists, Pacific Section, during 1978-79.

Coming from humble origins, Louis was proud of the hard work that led to his many accomplishments. His father was a migrant farm worker in the 1920's, and both parents, born in Mexico, became naturalized United States citizens. His parents, especially his mother, taught their children the importance of education and assimilation into the North American culture in order to obtain the American dream -- a prize he earned.

Louis is preceded in death by his son Erik Villanueva, who passed away in 1997. He is survived by his wife Shelley Villanueva; his children Alia (Linda) Villanueva, Joanie Villanueva, David Villanueva, Dianne Olswang-Peck, Jeff Tyler, Jerry Tyler, and Joel Tyler, and 15 grandchildren.

Louis will be remembered in a private gathering of family and friends. In lieu of flowers, please consider making tax deductible gifts to the American Heart Association, http:// www.donate.heart.org/ or Hospice of North Idaho, http://www.hospiceofnorthidaho.org/giving/.

Dear friends and colleagues,

While this newsletter arrives to our membership, many of us will be attending the much anticipated 2015 PACIFIC SECTION CONVENTION (May 3-5, 2015). I am really looking forward to seeing you all there and sharing a fantastic technical program jam packed with talks, field trips and short courses!

The July-August Post Convention newsletter will arrive in early July and will cover the convention program, awards ceremonies, events and share many color photos of the proceedings. Please send me your favorite photos of the convention for including in that newsletter! And, please feel free to send in comments and write ups of any events you attended; it's always great to get reader stories included in the PPG.

Please also remember that it is PSAAPG Officer Elections time and the voting ballots are circulating. For officer bios and photos, please see the last issue of PPG.

Announcement: Tony Reid Elected as Advisory Council Member

The Pacific Section has elected Tony Reid (Director Technical Resources, California Resources Corporation) as its next Advisory Council Member, replacing Jon Schwalbach whose term expires on June 30. Tony has previously served Pacific Section in many capacities, including the Society President in 2013. In his role as Advisory Council representative, he will be the Pacific Section's link to the AAPG Executive Committee. The Advisory Council makes recommendations to the Executive Committee for National AAPG Honors and Awards and officer candidates, as well as studying other issues as requested by the Executive Committee. The Advisory Council is currently looking at the governance structure of AAPG, and Tony will represent Pacific Section in those discussions.

See you in the halls of the Mandalay Beach Hotel soon!
Sincerely,
Vaughn

Historic Development of Fracturing and Hydraulic Fracturing
Part III – Going Nuclear During Peak Oil (1960s)

Introduction

In looking back at the historic development of fracturing and hydraulic fracturing well stimulation techniques, we have observed the technological advancement from the use of explosives and guns, to the introduction of acids and agents such as napalm in the implementation of the Hydrafrac Process of the late 1940s and early 1950s (Testa, 2015a and 2015b). We also observed the beginning of the age of the petroleum engineer. In Part III herein, we are going nuclear and observe what was going on during the crazy 1960s. In the 1960s, the concept of peak oil and prediction of decline loomed on the horizon.

Operation Plowshare

The 1960s brought on a new style of fracking referred to as "*nuclear fracking*". The Plowshare Program was established by the then U.S. Atomic Energy Commission (AEC), now a part of the Department of Energy (USDOE). While the U.S. was developing nuclear weapons during the Cold War for defense purposes, some scientists and government-agency personnel were pursuing a program that would use the power of nuclear explosives for peaceful purposes. The reasoning was straight forward – use the relatively inexpensive energy available from nuclear explosions "*to find practical industrial and scientific uses for nuclear explosives*" (Carlisle and Carlisle, 1967).

Conceptually, industrial applications resulting from the use of nuclear explosives could be divided into two broad categories: 1) large-scale excavation and quarrying, and 2) underground engineering (USDOE,1961). Energy from the explosion could be used to break up and/or move rock; or energy released from deeply buried nuclear explosives could increase the permeability and porosity of the rock by massive breaking and fracturing, respectively. Excavation applications included canals, harbors, highways and railroad cuts through mountains, open pit mining, construction of dams, and other quarry and construction-related projects. Underground applications included stimulation of natural gas production, preparation of leachable ore bodies for in situ leaching, creation of underground zones of fractured oil shale for in situ retorting, and formation of underground natural gas and petroleum storage reservoirs.

On June 6, 1958, the AEC publicly announced the establishment of the Plowshare Program, named for the biblical injunction to ensure peace by beating swords into plowshares (Isaiah 2:4).

> *"And they shall beat their swords into plowshares, and their spears into pruning hooks; nation shall not lift up sword against nation, neither shall they learn war any more."*

The Program objective was to use nuclear explosives for civilian as opposed to military purposes. In the end, although less dramatic than nuclear excavation, the most promising use for nuclear explosions proved to be for stimulation of natural gas production.

The Plowshare Program commenced in 1958 and would continue through 1975. From 1961 to 1973, researchers carried out 27 separate experiments under the Plowshare Program resulting in 35 nuclear detonations. Most of the experiments focused on creating craters and canals, with some optimistic applications such as widening the Panama Canal. Individual endeavors pertaining to fracturing to enhance gas and oil well stimulation, as employed throughout the 1960s and early 1970s included numerous projects many of which were not executed. Individual projects included Pinot, Oilsands, Oil Shale, Project Gasbuggy, Project Dragon Trail Study, Project Ketch, Project Bronco Study, Project Wagon Wheel, Project Wasp, Rulison nuclear test, and Rio Blanco (Table 1). Nuclear tests were mostly conducted in Nevada, but also took place in the petroleum fields of New Mexico and Colorado, and were planned but never implemented in Wyoming.

(Continued on next page)

Project Gasbuggy

All this nuclear interest actually started taking form in 1954 when the El Paso Natural Gas Company (EPNG) discovered a gas field between 7,500 and 10,700 feet below the surface south of Pinedale in Sublette County, Wyoming. Six wells were drilled and it was estimated that approximately four trillion standard cubic feet of natural gas comprised the field; however, the natural gas was in low-permeability sandstone formations. The cost of available technology to fracture the rock did not justify building a pipeline to the field. EPNG subsequently proposed a nuclear stimulation concept for the Pinedale unit to the AEC in 1958.

From Wyoming we move to New Mexico with a project known as *Project Gasbuggy.* This project included experts from the AEC, the United States Bureau of Mines and EPNG. The actual project was essentially the first of a series of underground nuclear detonations carried out by the AEC on December 10, 1967, in rural northern New Mexico to test the feasibility of using nuclear explosions to release natural gas trapped in dense shale deposits (Figures 1 and 2).
Highly radioactive material in the area was subsequently removed, and the site is now level ground safe to approach at the surface. Drilling or digging in the area however is prohibited. In 1978, a placard, noting ground zero, was installed at the site. The placard is publicly accessible via the dirt road New Mexico F.S. 357/Indian J10 through Carson National Forest (Figure 3).

Project Rulison and Project Rio Blanco

Two later tests took place in Colorado: one in 1969 called Project Rulison, and in 1973 called *Project Rio Blanco*. Project Rulison, near Rulison, Colorado, used a 43-kiloton nuclear device almost 8,500 feet underground to produce commercially viable amounts of natural gas. Project Rio Blanco, northwest of Rifle, Colorado, was designed to increase natural gas production from low-permeability sandstone. Project Rio Blanco consisted of nearly three simultaneous detonation each 33-kiloton in a single well. According to the Office of Environmental Management, the explosions occurred at depths of 5,838, 6,230, and 6,689 feet below ground level. It would prove to be the last experiment of the Plowshare Program.

Project Bronco

Another test, called *Project Bronco*, was proposed but never took place. This test would have consisted of a 50-kiloton nuclear explosion to fracture deep oil shale deposits. Termination of the Plowshare Program occurred in 1975, stemming from growing concern about adverse environmental impacts and concerns. Although wells were drilled and natural gas was extracted from the site, the gas proved to be too radioactive to be commercially viable.

Project Wagon Wheel

The story does not end in Colorado however, but with EPNG in Wyoming. The results of the Gasbuggy test explosion encouraged EPNG to pursue study of "*Project Wagon Wheel*". Cooperating on the project were EPNG, the AEC, and the U.S. Department of Interior as specified in Contract No. AT(26-1)-422 between the United States of America and EPNG, dated December 24, 1968. Project Wagon Wheel differed, however, from Gasbuggy because its goals included obtaining cost information as well as technical information. Gasbuggy's objectives were to determine the engineering, but not to be a profitable investment.

Project Wagon Wheel was to be Wyoming's nuclear stimulation project, nestled in Sublette County, Wyoming. Sublette County is located in southwestern Wyoming and in 1970 had a population of 3,755. There were four towns between ten and twenty miles from the proposed blast site.

The Project Wagon Wheel test was initially scheduled for 1973 but as time passed, the date for the test was postponed and then postponed several times thereafter. In September 1973, the AEC announced that "*the project is still in the design stage and no execution has been authorized as yet,*" and that the test would probably not occur before fall 1974. Unlike its predecessors, Project Wagon Wheel was not detonated. Had it been tested, five nuclear devices would have been detonated sequentially from bottom to top between 9,220 feet and 11,570 feet below the surface. The detonations would have created an underground rubble chimney approximately 2,800 feet high and about 1,000 feet in diameter.

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The five nuclear devices would have been 100 kilotons each and detonated approximately five minutes apart, and estimated to be about 35 times as great as the energy of the gas which was expected to be produced. After the blast, four to six months would have had to pass before test production of natural gas to allow for the decay of "short-lived radioisotopes, albeit, there would be anticipated release of radiation during the 325-day flaring of the well.

The exact date Wagon Wheel died is unclear. President Nixon's budget for fiscal year 1974 did not include funding for tests under Plowshare, which included Project Wagon Wheel. Had Project Wagon Wheel proceeded, it would have been mild compared to what was planned when EPNG commenced full field production. There could have been as many as forty to fifty nuclear detonations a year, some within a mile of Pinedale, Wyoming.

The test-well drilled for Project Wagon Wheel was never used in a nuclear test but was employed by EPNG to conduct tests of "Massive Hydraulic Fracturing" (MHF) during 1974 and 1975. MHF was the now familiar method where water was pumped into a well until the pressure of the water caused the rocks to fracture. The study used the well originally drilled for Project Wagon Wheel, but concluded the MHF technique employed was not commercially feasible..

Peak Oil

By 1974, approximately 82 million dollars had been invested in the nuclear gas stimulation technology program (i.e., nuclear tests Gasbuggy, Rulison and Rio Blanco). It was estimated that even after 25 years of gas production of all the natural gas deemed recoverable, that only 15 to 40 percent of the investment could be recovered. At the same time, alternative, non-nuclear technologies such as hydrofracturing were being developed. Concurrently, pressure of economic and environmental concerns was increasing, and on June 30, 1975, the Plowshare Program was terminated. On May 28, 1976, the Treaty on Underground Nuclear Explosives for Peaceful Purposes was signed by the United States and the then Soviet Union.

We truly cannot move forward in this discussion without some words regarding peak oil. Peak oil is the point in time when the maximum rate of oil and gas extraction is reached, after which the rate of production is expected to enter terminal decline. It accurately reflects individual production in wells and fields. Initially, every oil and gas well and field exhibits an increase in production, and eventually reaches a peak production before production subsequently declines. Enhanced efforts can prolong production but overall production of each well typically follows a production curve, peaking at one point, then trailing off in an inevitable decline with time. Despite the implementation of enhanced recovery techniques, ultimately production decline occurs nonetheless.

Referred to as the Hubbert Curve (Figure 4), the ultimate production curve showing oil production was first used in models describing peak oil in 1956. Based on Hubbert's theory, as presented in a paper to the 1956 meeting of the American Petroleum Institute in San Antonio, Texas, it was predicted that overall petroleum production would peak in the United States between 1965, which he considered most likely, and 1970, which he considered an upper-bound case. The ultimate potential production of crude oil at the time was estimated to be 1,250 billion barrels. As large-scale conventional oil and gas production eventually declined as Hubbert predicted, unconventional methods were being used to augment oil and gas supplies. Later, the concepts behind the Hubbert curve would also be used to describe peak world oil, and for other finite resources as well. The ultimate doom-and-gloom scenarios to follow from the perspective of Hubbert's Curve would set the stage for Federal involvement and investment, and the development of new technology and an entrepreneurial spirit. This would all lead to Part IV - the rise of the unconventionals.

References

Carlisle, N. and Carlisle, J., 1967, Project Gasbuggy Seeks a Wider Source of Fuel: In *Popular Mechanics*, September 1967, Vol. 128, No 3, pp. 104-105, 222.

Hubbert, M. King, 1956, Nuclear Energy and the Fossil Fuels: Presented at the Spring Meeting of the Southern District, Division of Production, American Petroleum Institute, San Antonio, Texas, Match 7-9, 1956; In *Drilling and Production Practice*, American Petroleum Institute, Publication No. 9555, Shell Production Company, June 1956, 57 p.

United States Department of Energy, 1961, Plowshare Program, San Francisco Operations Office, 41 p.

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Table 1
Plowshare Program Experiments

Project	Date	Location	Type/Yield	Purpose
Nuclear Tests				
Gasbuggy	12/10/1967	Farmington, NM (55 miles E)	Shaft/29 kt	A gas stimulation experiment to investigate the feasibility of using nuclear explosives to stimulate a low-permeability gas field; first Plowshare joint government-industry nuclear experiment to evaluate an industrial application.
Rulison	09/10/1969	Grand Valley, CO (45 miles NE of Grand Junction)	Shaft/40 kt	A gas stimulation experiment to investigate the feasibility of using nuclear explosives to stimulate a low-permeability gas field; provide engineering data on the use of nuclear explosions for gas stimulation; on changes in gas production and recovery rates; and on techniques to reduce the radioactive contamination to the gas.
Rio Blanco-1, 2 and 3 (simultaneous, same hole)	05/17/1973	Rifle, CO (50 miles N of Grand Junction)	Shaft/33 kt	A gas stimulation experiment to investigate the feasibility of using nuclear explosives to stimulate a low-permeability gas field; develop technology for recovering natural gas from reservoirs with very low permeability.
Proposed But Not Executed				
Oilsands	1959	Athabasca, Canada	Nuclear explosive	Study the feasibility of oil recovery using a nuclear explosive detonation in the Athabascan tar sands.
Oil Shale	1959	Not determined	Nuclear explosive	Study a nuclear detonation to shatter an oil shale formation to extract oil.
Dragon Trail	12/1966	Rio Blanco County, CO	Nuclear explosive	Natural gas stimulation experiment; different geological characteristics than either GASBUGGY or RULISON; geological study completed.
Ketch	08/1967	Renovo, PA (12 miles SW)	Nuclear explosive	Create a large chimney of broken rock with void space to store natural gas under high pressure.
Bronco	10/1967	Rio Blanco County, CO	Nuclear explosive	Break oil shale deposits for in situ retorting; exploratory core holes drilled.
Thunderbird	1967	Buffalo, NY (35 miles E)	Nuclear explosive	Coal gasification; fracture rock-containing coal and in situ combustion of the coal would produce low-Btu gas and other products.

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Wagon Wheel	01/1968-1974	Pinedale, WY (19 miles S)	Nuclear explosive	Natural gas stimulation; study stimulation at various depths; an exploratory hole and two hydrological wells were drilled.
Wasp	07/1969-1974	Pinedale, WY (24 miles NW)	Nuclear explosive	Natural gas stimulation; meteorological observations taken.
Utah	1969	Near Ouray, UT	Nuclear explosive	Oil shale maturation; exploratory hole drilled.
Geothermal Plant	1971	Not determined	Nuclear explosive	Geothermal resource experiment; fracturing would allow fluids circulated in fracture zones to be converted to steam to generate electricity.

Figure 1. Scientists lower a 13-foot by 18-inches diameter nuclear warhead into a well in New Mexico. The experimental 29-kiloton Project Gasbuggy device will be detonated at a depth of 4,240 feet. (Los Alamos Lab photo. http://aoghs.org/oilfield-technologies/project-gasbuggy)

Figure 2. Gasbuggy: Site of the first United States underground nuclear experiment for the stimulation of low-productivity gas reservoirs. (http://aoghs.org/oilfield-technologies/project-gasbuggy)

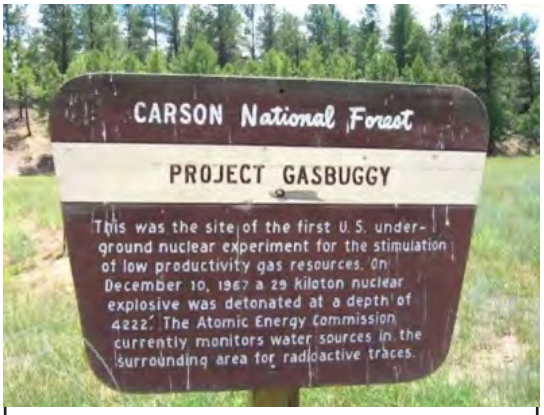

Figure 3. Project Gasbuggy, the underground detonation that was part of a bigger program begun in the late 1950s to explore peaceful uses of nuclear explosions. (http://aoghs.org/oilfield-technologies/project-gasbuggy)

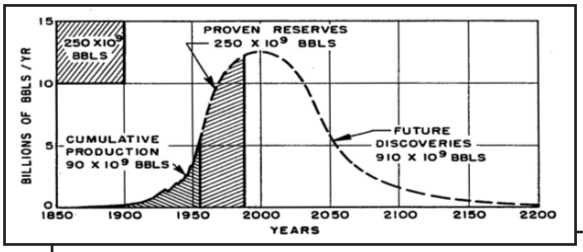

Figure 4. Hubbert's curve and peak (Hubbert, 1956).

PSAAPG's 2015 Imperial Barrel Award (IBA) Competition

2015 was an amazing year for our IBA teams. PSAAPG had seven schools competing this year! Regular competitors came from University of Alaska - Fairbanks, University of California Santa Barbara, San Diego State University, California State University Bakersfield, and California State University Northridge. For the first time Portland State University and California Polytechnic University - Pomona had IBA teams.

The competition was held Friday March 27th at Aera's Bakersfield office. We had a panel of five Judges from our sponsoring companies. Ariel Auffant-Chevron, Cynthia Black-CRC, Greg Gordon- Aera, Dave Miner-Aera, and Dan Schwartz-Aera.

The Winning Team - University of Alaska Fairbanks:

The winning team from left to right: Deirdre LaBounty; Jacob Rosenthal; Panav Hulsurkar; Rafael Orozco; and advisor Catherine Hanks.

University of Alaska – Fairbanks (UAF) will represent the PSAAPG at the IBA finals held before the Annual AAPG Convention. The Fairbanks team will be competing against other IBA teams from across the globe.
Congratulations to UAF and good luck in Denver!!!

Thanks to our awesome judges and sponsors. From left to right: David Miner; Cynthia Black; Dan Schwartz; Greg Gordon; and Ariel Auffant.

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Second Place - California State University Bakersfield:
Nick Moreno, Eric Heaton, Jordan Martin, Jeff Kimber, and Matt Van Grimsven. Advisor- Janice Gillespie.

Third Place - San Diego State University:
Elizabeth White, Daniel Peppard, Luke Zimmerman, Ellen Buelow, and Neil Seitz. Advisor- Kip Hering

Honorable Mention:
- California Polytechnic University Pomona
- California State University Northridge
- Portland State University
- University of California Santa Barbara

All of the teams did a great job this year and caliber of the presentations improves every year.

I want to thank the sponsors Aera, Chevron, Chesapeake, PSAAPG and CRC. Without their generous support holding the PSAAPG IBA competition would not be possible!

I also want to thank the judges, advisors, mentors, my co-chairman (Marck Maroun), and all the fantastic volunteers!

Cynthia Huggins

Can we be honest about Climates?

by Phil Ryall

In 1993 I was at a Geological Convention and heard Dixy Lee Ray, ex-Governor of Washington State, speak about Environmental Overkill and had her sign a copy of her book just published called "Environmental Overkill". It made me really aware of the many concepts on the Environment that were and are wrongly being promoted by the Environmental Extremists in the World about climate, land , species of animals and plants and atmospheric issues.

Since that time and being in the oil exploration and production business I have observed and been effected by new laws and regulations on the Environment. Don't get me wrong- I know that we have pollution problems on earth and air and some critter protection problems, but let's face it the regulations on air , water and earth are overdone and now extreme. They are restricting business and costing us all hugely for overkill on protecting the environment!

The worst example that I know of is the idea that manmade air pollution is causing Climate Change or Global Warming as it used to be called. In the 1970's cooling period we were causing a Ice Age to come back! That was not true and the global warming and climate change discussion is wrong. Some people have created computer models that show extreme weather and climate changes and they are wrong as ; why is Antarctica getting colder and a thicker sheet of ice in recent years? Climates are complex and mostly controlled by the Sun and Oceans as proven by observations. CO2 is not the culprit and if it were we do not control most of it.

I have read every bit of literature in the 20 years plus since listening to Dixy Lee Ray who was a former Governor of Washington, Chairman of the Washington University Zoology Faculty, Chairman of the Atomic Energy Commission and Assistant Secretary of State in the U.S. Bureau of Oceans.

I could give a whole list of books and literature on the subject, but the best and most recent literature covering the subject is the book "Climate Change Reconsidered II" published in 2013.

I would like to see our Geological Organizations and Individuals study the Global Climates issue and come to the conclusions that I have and then write and campaign to get honesty on the subject with our Governing Agencies so that we can honestly deal with real problems.

Thanks, Phil Ryall, (50 years a geologist)

Alaska Geological Society Membership Renewal:

Dear AGS Member,
In May, 2015 the Alaska Geological Society will cease to print and mail out the monthly newsletter and all future newsletters will go out as electronic (pdf) files attached to e-mails. The AGS Board of Director's decision to distribute newsletters in solely an electronic format was reached because the preparation and mail-out of printed newsletters is one of the largest costs borne by the Society and is not offset by revenues from dues, thus eroding the reserve scholarship funds. At present our membership roster lists 263 past and present members, most receiving printed newsletters, with 97 active members (dues paid through November 2015).

To continue to receive the AGS newsletters after May 2015, you will need: 1) to be an active member (annual dues paid up); and 2) to provide the Society with a functional e-mail address. Membership renewals or submissions of updated e-mail addresses can be done through the AGS web page at http://www.alaskageology.org/membershipSUBMIT.htm or by e-mail to membership@alaskageology.org, respectively. If you want to find out your membership status please contact the AGS at membership@alaskageology.org and we will be happy to reply with a check of our records. The AGS membership dues cycle starts on November 1st of each year.

Tenure-Track Faculty Position in Sedimentary Geology / Earth System Science, California State Polytechnic University, Pomona

The Geological Sciences Department invites applications for an Assistant Professor tenure-track appointment beginning September 2015. Applicants must hold a PhD in Geology or a related field by August 2015. The ideal candidate will have teaching and research interests that link shallow lithosphere sedimentary processes with specialized fields such as Sedimentology, Stratigraphy, Earth History, Global Environmental Change, Critical Zone Science, Energy Resources, Basin Analysis, Marine Geology.

We seek a versatile faculty member to teach Sedimentary Geology and Earth Time and Life, and contribute to instruction of courses such as Blue Planet, Petroleum Geology, Oceanography, Meteorology, Coastal Processes, Geotectonics, GIS Applications and our popular Field Modules that utilize modern digital mapping tools and instrumentation. The successful candidate is expected to ensure that our curriculum in their specialty area remains current, engage students in research and supervise MS and Senior theses.

He/she should have experience with field studies and data collection using modern instrumentation. Preferred qualifications include demonstrated success with external funding, established ties to research institutions, petroleum industry or government agencies and interest in developing intradepartmental and cross-campus collaborations. Applicants must submit a signed application form (see http://academic.csupomona.edu/faculty/docs/application.pdf), letter of interest, CV, statement of teaching and research interests, and contact information for five professional references.

A campus interview, three formal reference letters and official confirmation of degree transcripts are required of all finalists. Initial screening begins January 7, 2015. Mail application materials to Search Committee Chair, Geological Sciences Department, California State Polytechnic University, Pomona, CA 91768. Cal Poly Pomona is an affirmative action, equal opportunity employer. Full Position Description: http://geology.csupomona.edu/employment.htm.

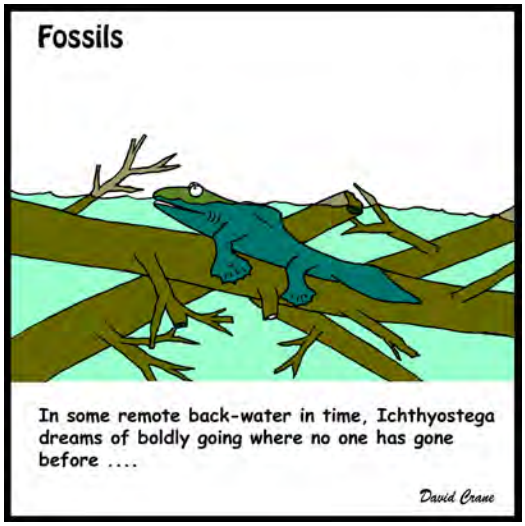
Alaska Geological Society

Alaska Geological Society luncheon meetings are held at the BP Energy Center in Anchorage, Alaska.
The meetings are typically scheduled on the 3rd Thursday of each month 11:30 AM – 1:00 PM

May 12th, 2015, 12:00-1:00 pm
Speaker: Ray Troll, Alaskan Artist
"Focused Exhumation Along Megathrust Splay Faults in Prince William Sound, Alaska"
NOTE: This is a joint meeting with the Geological Society of America's Cordilleran Section Meeting. Different locaton: ConocoPhillips Integrated Science Building, UAA Campus

Coast Geological Society

Next events to be announced after 2015 Pacific Section Convention



L.A. Basin Geological Society

Next events to be announced after 2015 Pacific Section Convention

Northern California Geological Society

May 27th, 2015, 6:00pm
Speaker: B. Lynn Ingram, UC Berkeley
"The West Without Water"

June 24th, 2015, 7:00pm
Speaker: Dr. Will Schweller, NCGS President and Consultant
"Injected Sands – Mother Nature's Giant Frac Job?"

Field trips

Saturday March 21st, 2015
Leader: Dr. Todd J. Greene, California State University, Chico
"Anatomy and provenance of a deep-water boulder conglomeratic submarine canyon in the Upper Cretaceous Panoche Formation (Cenomanian), Great Valley Group, San Luis Reservoir, central California"
HAS BEEN CANCELLED until a new date can be scheduled.
Members will be notified of the rescheduled field trip date.

Saturday April 25th, 2015
Leader: Dr. Allegra Hasford Scheirer and Dr. Leslie B. Magoon, Stanford University
"An undefined Petroleum system along the Santa Cruz County coast, California"

Northwest Energy Association

May 21st, 2015
Speaker: Michael Hinrichs. Director of Public Affairs, Jordan Cove Energy Project, L.P.
"Update of the Jordan Cove Project at Coos Bay -an overview of the LNG export project and gas supply strategies "

Sacramento Petroleum Association

2015 SPA membership. Please send to: SPA, P.O. Box 1844, Folsom, CA 95763-1844.
Still $15/year, (or $20/yr. for hardcopy)
Meeting announcements to follow soon

San Joaquin Geological Society

May 12th, 2015
Speaker: Dr Wallace Kleck
"Pegmatites"

The field trip on April 15th led by Dr Saleeby was a great success, and helped raise some good funds for SJGS. SJGS is working on ideas regarding future field trips and symposia on the San Joaquin Basin. Ideas welcome.

Alaska Geological Society

www.alaskageology.org

P. O . Box 101288
Anchorage, AK 99510

Contact: Eric Cannon
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.

President:	Matt Frankforter	mfrankforter@hilcorp.com
President-Elect:	Keith Torrance	ktorrance at apcservicesllc.com
Vice-President:	Monty Mabry	monte.mabry@bp.com
Secretary:	Eric Cannon	eric_cannon@golder.com
Treasurer:	Alan Hunter	paleoman@mac.com
Past-President:	Ken Helmold	ken.helmold@alaska.gov

Coast Geological Society

www.coastgeologicalsociety.org

P. O. Box 3055
Ventura, CA 93006

Contact: Peter Morris
805.745.2149

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 Bonnie Walters (secretary@coastgeologicalsociety.org), and should be made by 4:00 p.m. on the Friday before the meeting.

President:	Bob Blackmur	president@coastgeologicalsociety.org
Past President:	Peter Morris	pastpresident@coastgeologicalsociety.org
Vice President:	Bonnie Walters	vicepresident@coastgeologicalsociety.org
Secretary:	Alastair Haddow	secretary@coastgeologicalsociety.org
Treasurer:	Theresa Heirshberg	treasurer@coastgeologicalsociety.org
Membership:	Nick Kunstek	membership@coastgeologicalsociety.org
Webmaster:	Whit Skaling	webmaster@coastgeologicalsociety.org

Los Angeles Basin Geological Society

www.labgs.org

Contact: Jean Kulla
949-500-3095

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.

President:	Jean B. Kulla	k2mobile@MSN.com
Vice President	Katherine Kovac	kovac_km@yahoo.com
Treasurer:	Bert Vogler	hvogler@kleinfelder.com
Secretary:	Graham Wilson	Gwilson@SHPI.net
Scholarships:	Karla Tucker	ktkr2@aol.com

Northern California Geological Society

www.ncgeolsoc.org

9 Bramblewood Court
Danville, CA 94506-1130

Contact: Barb Matz
Barbara.Matz@CBIFederalServices.com

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:

President:	Will Schweller	willschweller@yahoo.com
President-elect:	vacant	vacant
Program Chair:	John Karachewski	cageo@sbcglobal.net
Secretary	Dan Day	danday94@pacbell.net
Treasurer	Phil Reed	philecreed@yahoo.com
Membership Chair	Tom Barry	tomasbarry@aol.com
Newsletter Editor	Mark Detterman	mdetter1@gmail.com
Field Trip Coordinator	Tridib Guha	tridibguha@yahoo.com
Past President	Phil Reed	philecreed@yahoo.com
Scholarships	Phil Garbutt	plgarbutt@comcast.net

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	John Armentrout	jarmenrock@gmail.com
Vice-President	Bill Rodgers	wlrodgers@stoel.com
Past President	Jim Jackson	jackson.js@comcast.net
Treasurer	Barb Portwood	bbportwood@gmail.com
Secretary	Laird Thompson	lbtfracs@gmail.com
House of Delegates:	John Armentrout, Anne Fix	

Sacramento Petroleum Association

P. O. Box 1844
Folsom, CA 95763-1844

Contact: David Hartley
530.304.4277

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:	David Hartley	drilmax1@aol.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: Laura Bazeley
lbazeley@wziinc.com

We have dinner meetings on the second Tuesday of the month at the American Legion Hall at 2020 "H Street" in Bakersfield. 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:	Anne Draucker	AnneDraucker@chevron.com
Past President:	Laura Bazeley	lbazeley@wziinc.com
President-Elect:	Ariel Auffant	aauffant@chevron.com
Vice-President:	Greg Gordon	gsgordon@aeraenergy.com
Secretary:	John Abeid	John.Abeid@chevron.com
Treasurer:	Corine Armstrong	Corine.Armstrong@chevron.com

PACIFIC SECTION AAPG
P. O. BOX 1072
BAKERSFIELD, CA 93302