# PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

*of the Pacific Section*
*American Association of Petroleum Geologists*

**WINTER 1994 No. 1**


# CONVENTION ISSUE

## President's Column

Mark your calendar for April 27 – 30, the dates of the Pacific Section AAPG/SEPM/SEG convention to be held at the Doubletree Inn, Ventura, CA. The convention committee, chaired by Dalton Lockman, has four days of fun filled and informative activities planned for all those in attendance. Approximately 80 papers and posters given Thursday and Friday, the 28th and 29th, are the heart of the activities. Three short courses will be offered at the meeting. They are on Balanced Cross Sections, review for the California Registration exam, and Economic Evaluation of Oil Properties .

Two – two day field trips and four – one day field trips to local points of interest are planned.

Spousal activities have recently not been well attended, but your spouse may want to sign up to go on the bus tour of Santa Barbara and vicinity. It is my understanding that the tour will hit many of the antique and boutique shops on the coast between Ventura and Santa Barbara, in addition to a visit to the only banana plantation in the continental United States — no kidding!

Surrounding these core activities are the social events such as golf and tennis tournaments, joint luncheon and awards ceremonies, Tom Dibblee Honoree luncheon, Ice Breaker and of course Exhibit Hall.

Ventura is a great place for our convention. Prices are modest and weather is good this time of year. There is no other place where you will get as much information, rekindle as many friendships,. or make as many new friends for so little investment of time and dollars.

Currently, the Society's membership stands at about 750 members. Including the joint societies, membership rolls include over 1000 individuals. There is no reason at all why membership registration should not hit 750 at this meeting. There is indeed something here for everyone. The convention is put on for you! All the effort put forth to make this meeting successful will be lost if you are a no show. Only your participation will make it a success.

There's more information inside this newsletter. The preregistration package should go in the mail within the next 3 weeks. When you get your package, open it, fill it out and sign up for those activities you want to participate in. Mail it as soon as you can because some of the activities will only go with sufficient participation. We'll see you there!

•**Note:** On page 11 there is a ballot for you to vote on the revisions to the constitution and by-laws. Please take the time to read over these revisions and vote. Thank you.

*– Reinhard J. Suchsland*
*President*

The 1994 Annual Meeting of the Pacific Section American Association of Petroleum Geologists (AAPG), Society of Sedimentary Geology (SEPM), Society of Exploration Geophysicists (SEG), Association of Engineering Geologists (AEG), Society of Core Analysts (SCA), and AAPG Division of Environmental Geosciences, Energy Minerals, and Professional Affairs, will be held in Ventura, California from April 27—29, 1994. The site of the convention will be the Doubletree Hotel. The Coast Geological Society is hosting this year's event. The convention theme is "Rediscover California: From Outcrops to Oil". Technical Sessions and presiders are listed below.

## SESSIONS...

### Thursday, April 28, 1994

- ❑ SYMPOSIUM: Western Transverse Ranges
  Conveners: Bruce Luyendyk and Ron Heck
  Session I: Oil and Gas Fields in the Western Transverse Ranges *(morning)*
  Chair: Ron Heck

- ❑ SEPM: Cenozoic California Pot Pourri and Fall Fieldtrip Preview
  *(morning)*
  Presiding: Ray Ingersoll, Michael P. Gring and Richard L. Squires

- ❑ SYMPOSIUM: Western Transverse Ranges
  Session II: Plate Motions and Neotectonics *(afternoon)*
  Co-chairs: Tanya Atwater and Tom Rockwell

- ❑ AAPG: Oil and Gas Fields of California *(afternoon)*
  Presiding: John Williams

- ❑ DEG - AEG: Remediation of Crude Oil in Soil and Ground Water *(afternoon - following AAPG)*
  Presiding: Tim Garvey

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(*continued from page 1*)

## Friday, April 29, 1994

- ❑ SYMPOSIUM: Western Transverse Ranges
  Session III: Geologic Structures *(morning)*
  Co-chairs: Jim Crouch and Jay Namson

- ❑ DEG – AEG: Oil and Gas Related Regulations and Environmental Law *(morning)*
  Presiding: Kevin Neese

- ❑ SEG: Geophysics General Topics *(morning)*
  Presiding: Paul Mazalan and Dan Scopen

- ❑ SYMPOSIUM: Western Transverse Ranges
  Session IV: Stratigraphy and Geochronology *(afternoon)*
  Co-chairs: Rick Stanley and Peter Weigand

- ❑ SEPM SYMPOSIUM: Cenozoic Paleo geography of Southern California *(following Session IV, afternoon)*
  Chair: A. Eugene Fritsche

- ❑ DEG – AEG: Ground Water and Engineering Geology *(afternoon)*
  Presiding: Ali Tabidian and John Powell

**POSTER SESSION:** *(afternoon)*

## *SHORT COURSES...*

*(NOTE - ALL SHORT COURSES ARE OPEN TO THE GENERAL PUBLIC, AND DO NOT REQUIRE CONVENTION REGISTRATION)*

## Wednesday, April 27, 1994

**COURSE #1**
California Registered Geologist Examination Review
*Sponsor: Association of Engineering Geologists (AEG)*
8:00 A.M. to 5:30 P.M., with lunch break
Instructors: Patti Osiecki, C.E.G. and Lisa Dirth, C.E.G., REG REVIEW, Inc.
Cost: $350.00, *includes course manual and workshop materials, morning and afternoon refreshments*

**COURSE #2**
Economic Evaluation of Oil Properties for Geologists
*Sponsor: San Joaquin Geological Society*
8:00 A.M. to 12:00 NOON
Instructors: James R. Weddle and Donna M. Thompson, San Joaquin Energy Consultants
Cost: $60.00

**COURSE #3**
Balanced Cross Sections
*Sponsor: Davis and Namson, Consulting Geologists*
8:00 A.M. to 5:30 P.M., with lunch break
Instructors: Dr. Jay Namson and Dr. Thom Davis
Cost: $250.00, *includes course notes and workshop materials, morning and afternoon snacks and refreshments*

## *FIELD TRIPS...*

**FIELD TRIP #1**
Geology, Biology and History of Santa Cruz Island
Dates: Saturday and Sunday, April 30 – May 1
Departure: 8:30 A.M. Saturday *(from Ventura Harbor)*
Return: 6:00 P.M. Sunday *(to Ventura Harbor)*
Coordinators: Peter Weigand, CSU Northridge (Miocene volcanics), Chris Sorlien, Institute for Crustal Studies (Structural geology), Marla Daily, Santa Cruz Island Foundation (Island history) and Mark Pierson, Department of Interior (Marine Biology). *Limit - 25.*

**FIELD TRIP #2**
Sequence Stratigraphy of the Western Transverse Ranges
Dates: Saturday and Sunday, April 30 – May 1
Departure: 7:30 A.M.
*(both days, from Doubletree Hotel)*
Return: 6:00 P.M.
*(both days, to Doubletree Hotel)*
Coordinators: Kirt Campion, EXXON Production Research and John Lohmar, EXXON Company U.S.A.
*Limit - 30.*

**FIELD TRIP #3**
Santa Barbara Goundwater and Wines
*Sponsor: Coast Geological Society*
Date: Wednesday, April 27
Departure: 9:00 A.M.
*(from Doubletree Hotel)*
Return: 6:00 P.M. *(to Doubletree Hotel)*
Coordinators: Earl LaPensee and Linda Smith, Richard C. Slade and Associates. *Limit - 20*

**FIELD TRIP #4**
Structural Transect Across the Western Transverse Ranges
Date: Saturday, April 30
Departure: 7:30 A.M.
*(from Doubletree Hotel)*
Return: 6:30 P.M. *(to Doubletree Hotel)*
Coordinators: Thom Davis and Jay Namson, Davis and Namson, Consulting Geologists
• NOTE–This field trip is designed to accompany the short course,"Balanced Cross Sections in Hydrocarbon Exploration and Production", offered Wednesday, April 27, 1994. Those persons registered for the short course have first priority for this field trip. Sign up for both and save $50.00!

**FIELD TRIP #5**
Monterey Formation Along the Coastline between Santa Barbara and Gaviota, California
*Sponsor: San Joaquin Geological Society*
Date: Saturday, April 30
Departure: 7:00 A.M.
Return: 5:00 P.M.
Coordinator: Scott Hornafius, Mobil Exploration and Producing U.S., Inc.
• NOTE–Due to public interest in Mobil's proposed "Clearview Project", this trip is open to non-registrants of the Convention.

**FIELD TRIP #6**
Miocene Sedimentary & Volcanic Environments, Santa Monica Mountains
Date: Sunday, May 1
Departure: 7:30 A.M.
Return: 5:30 P.M.
Coordinators: Eugene Fritsche, CSU Northridge, Tom Dibblee, Thomas W. Dibblee, Jr. Foundation, Helmut Ehrenspeck, Thomas W. Dibblee, Jr. Foundation.

**FIELD TRIP #7**
Hike Chief Peak
Date: Saturday, April 30
Departure: 8:00 A.M.
Return: 4:00 P.M. (approx.)
Coordinator: Bob Michael

## *GENERAL EVENTS...*

**SPOUSE/GUEST EVENT**
Friday, April 29 9:00 A.M. to 3:00 P.M.
Ventura County Scenic Trip Adventure

**ALL CONVENTION LUNCHEON**
Thursday, April 28 11:30 A.M. to 1:30 P.M.
Cost: included in registration. for one-day registrants or guests, $15.00 per person.
Speaker: Margaret Leslie Davis, author of Rivers in the Desert: William Mulholland and the Inventing of Los Angeles.

**ALL CONVENTION HAPPY HOUR**
Thursday, April 28 5:30 P.M. to 6:30 P.M.

**SANTA MARIA STYLE BARBECUE, MUSIC AND BEER TASTING**
Thursday, April 28 7:00 P.M. to 10:00 P.M.

**DIBBLEE MEDAL AWARD LUNCHEON**
First Dibblee Medal Award Luncheon
Friday, April 29 11:00 A.M. to 1:00 P.M

**GOLF TOURNAMENT**
Wednesday, April 27 First tee off: 10:30 A.M.

**TENNIS TOURNAMENT**
Wednesday, April 27 1:00 P.M. to 4:00 P.M.

**BEACH VOLLEYBALL TOURNAMENT**
Wednesday, April 27 4:00 P.M. to 6:00 P.M.

Anyone still having checks or credit card bills that have not been cleared from the Long Beach Convention, please contact Don Clarke (310) 570-3915 or Don Hallinger (213) 244-2846.

## San Joaquin

### DINOSAUR NIGHT!

The March 8th dinner meeting of the SJGS will feature **Brent Breithaupt** – University of Wyoming, Laramie. **"Dinosaurs of the Western Interior: The Real Jurassic Park"** is his topic. Brent is a dynamic speaker so this promises to be an exciting talk. Brent is one of the world's foremost authorities on dinosaurs and he oversees the fossil collection for the museum at the University of Wyoming. He recently assisted in the filming of "Jurassic Park". The GENERAL PUBLIC IS INVITED. If you know anyone who is interested in dinosaurs, please bring them along. Cost is **$14.00** with reservations; **$17.00** without reservations.

The DIVISION OF ENVIRONMENTAL GEOSCIENCES will be hosting a technical presentation from 5:00 P.M. to 6:00 P.M. (before SJGS Happy Hour). Although the speaker and title of the talk were not available at press time, the talk will be either on environmental geology or hydrogeology. Please call Sue Kiser at (805) 326-1112 for details.

On April 12th, Frank Montasero will present a talk on the **"Geothermal Potential in the Neogene Extension, Indian Wells Valley, China Lake Naval Weapons Center"**. Frank's talk represents an integrated study based on both deep seismic data and well evaluation.

The talk for May 10th is still to be decided. If you have suggestions for speakers or topics you would like to hear, please give **Fred Bair** a call at **(805) 395-6476.**

The dinner meeting on June 14th is **CSUB Senior Thesis Night.** The meeting will feature posters and short talks on senior and graduate research projects at CSUB.

The dinner meetings are held at the American Legion Hall at 2020 "H" Street in Bakersfield. The attitude adjustment starts at 6:00 P.M., and dinner is served at 7:00 P.M. with the talk after dinner. For reservations, please contact **Mike Clark,** ARCO Western Energy at **(805) 632-6254** BEFORE 3:00 P.M. on Monday, March 7th. **RESERVATIONS MUST BE MADE TO GUARANTEE DINNER.**

## Coast

### A Call to Action

At 4:31 A.M. on January 17, all of Southern California was rudely awakened by an earthquake measuring 6.8 on the Richter scale. We, in the Ventura area, had a power loss for 10 hours. Therefore, we were not aware of the scientific data being given out by the people at Cal Tech during these early hours. With power restored, the first TV. briefing that we were able to view showed a cross section from the San Gabriel Mountains through the valley to the Santa Monica Mountains; and the coastline. The faults shown were the east dipping San Gabriel fault; the north dipping San Cayetano fault and an unnamed south dipping fault under the San Cayetano which had ruptured at a depth of ten miles, with the epicenter located beneath the city of Northridge. Tom Wright (Chevron retired) called Cal Tech and suggested that the "unnamed **new** fault" could be the south dipping east/west trending Oakridge/Frew system. The Cal Tech people acknowledged this fact and gave credit to "an oil company geologist" for furnishing them with this information.

The reason for all that has proceeded is in the last sentence: "an oil company geologist" furnished the scientists at Cal Tech, J.P.L. and the U.S.G.S. with fault data that we, in our branch of the profession, had been aware of for probably forty years.

Much of the subsurface data in these southern basins (Ventura – L.A.) is public knowledge having been published in many journals and guidebooks, therefore, we are not talking proprietary company data. That is the point that I would like to put forth to the membership. We have just experienced an earthquake that killed 61 people and injured 9,159; of whom 1,397 were hospitalized.The quake damaged or destroyed 45,319 homes.The preliminary cost estimate of the damage is between $15 and $30 billion dollars.

In light of the many regulations and restrictions regarding drilling in these basins, especially the L.A. basin, we don't envision any large exploration projects to be initiated by the major energy companies. Therefore, what we are suggesting is that the Pac. Section A.A.P.G. take the initiative and approach the major companies with a request that their, here to for, "proprietary" seismic data be made available to the research scientists involved in seismic studies of these areas. The review of this data could be coordinated through one of many groups such as the Southern California Earthquake Center, the Institute of Crustal Studies, the U.S.G.S. or Cal Tech – just to name a few.

This data would be for expanding the understanding of earthquake mechanisms and would not be available to the general public or private energy exploration companies. If this data could, in any way, enable these scientists to improve their ability to predict the timing of seismic events or the location of previously unrecognized fault trends and areas of potentials seismic hazard, thereby saving lives and the loss of property, the humanitarian effort would well be worth it. In addition, such a gesture by the petroleum industry in sharing the expensive data with other scientific groups for the benefit of the public, could go a long way in improving our industry's image with the general public. Therefore, the officers of the Coast Geological Society strongly urge the Pacific Section A.A.P.G., as the voice of our profession, to initiate such a program.

*Dale Kunitomi, President*
*G.C. "Butch" Brown, Vice-President*
*Steve Hart, Secretary*
*Jan Dependahl, Treasurer*

- **Upcoming Meetings**

March 15, 1994
Speaker: Helmut Ehrenspeck – Dibblee Foundation
Topic: 'The Conejo Volcanics: Field Relationships and Depositional Environments"

April 5, 1994 *(note date change)*
Speaker: AAPG Distinguished Lecturer – Gregory Ulmishek – USGS
Topic: "Geology and Exploration Potential of Major Petroleum Basins in the Former USSR"

May 17, 1994
Speaker: Eugene Fritsche – CSU Northridge
Topic: Middle Tertiary Sedimentary Relationships Between the Santa Ana and Santa Monica Mountains as Related to the Development of the L.A. Basin"

## Northwest

Multnomah Athletic Club – 2nd Floor
Dunaway Couch Room
1849 SW Salmon Street – Portland, OR.

Board Meeting: 10:15 A.M. – 11:00 A.M.
Social hour: 10:00 A.M. – 11:45 A.M.
Lunch: 11:45 A.M.
Assn. Meeting: 12:00 NOON – 12:15 P.M.
Speaker: 12:15 P.M. – 12:45 P.M.
Speaker Questions: 12:45 P.M. – 1:00 P.M.

For reservations call: Shelley Thomas
at 220-2573, $15.00
Non-luncheon seats available
VHS Videotape of speakers available

Friday, March 11, 1994 – James Hoff, Senior Business Development Representative for Northwest Pipeline Company. Hoff is a pivotal decision maker in Northwest Pipeline's development of pipeline infrastructure and storage for the region. Northwest Pipeline has estimated a need for approximately 40 billion cubic feet of natural gas storage to meet the Northwest's energy needs. Hoff is on the Board of Directors for the Jackson Prairie Storage Field, Washington and is knowledgeable about the further development of that resource.

Friday, April 8, 1994 – William F. Sattler, Vice President of Development of PowerLink Corporation. PowerLink, formerly PG&E's co-generation unit is permitting and planning a 250 kW co-gen plant at the Port of St. Helens. Sattler will discuss the natural gas generated electrical needs, regulations and other co-gen projects being planned in the region.

NWPA Membership Drive
$25.00 Yearly Dues
Contact: Robert A. Pinotti
220-2573

## Sacramento

Mr. Tor Nilsen would like to announce the final sale of the reports by Applied Earth Technology, of its reports that were prepared in 1985-90 covering the San Joaquin and Sacramento basin. The geologic reports cover the Forbes, Starky and Winters formation as well as others. If more information is needed call Tor at (415) 591-4328.

On behalf of Krug Dunbar, who passed away on December 10, 1993, the SPA has made a donation to the Rio Vista Museum. As mentioned in the January newsletter, Krug was the Curator of the Museum for 14 years. He had given the museum many pieces of oilfield memorabilia. The Rio Vista Museum is not to be mistaken for the Railroad Museum on Hwy. 12, but is located at 16 North Front Street in Rio., and is open Sat. and Sun. from 1:30 – 4:30 P.M. The phone number is (707) 374-5169. Go down some day and pay them a visit, it is said to be quite interesting.

The meeting format this year will be a little different. We are planning for two meetings a month, ideally the second and fourth Wednesday. It is our goal to always have a speaker at the meeting. Watch the newsletter for the dates. We started off with our first speaker, Dale Gray, going in for a knee operation on the meeting day. Something about trying out for the World Cup Soccer team last summer. Thanks Arsen Shahnazarian for helping out.

**YOUR 1994 DUES**
**ARE DUE NOW!!**
**$10 BUCKS**
If you have paid,
please disregard above statement.

## Alaska

### The Great Alaskan Lock Out

Recent announcements by the Federal Government in Alaska are sending a clear message to the state and all geologists: "We don't want you here unless you are part of the regulatory community". The US Bureau of Mines in Alaska will be totally eliminated as of fiscal 1995. The Minerals Management Service will be cut 50%. The US Geological Survey is also targeted for a significant reduction. These 3 agencies have the primary charge of providing unbiased information on the geology and natural resources of Alaska to the federal government which owns and manages over half the state, as well as to industry, academia and the general public. This is not only harsh medicine to the geologic community, it is an affront to all concerned citizens.

Federal agencies operating in Alaska without budget cuts include the minerals division of the National Park Service,the US Environmental Protection Agency, the US Fish and Wildlife Service, and National Marine Fisheries. All of these agencies are charged with regulatory oversight of resources in Alaska. If unbiased information about geology and resources is no longer available to taxpayers and the agencies their tax dollars underwrite, the resource industries will be regulated into extinction. The message to Alaska is very clear: "We will regulate your industries and are unwilling to support the basic research needed to make informed decisions."

Alaska is a resource–rich state. The "Right-sizing" (that's what the feds are calling it) of these agencies will be detrimental to the future development of resources in Alaska. Only 7% of Alaska is mapped at a scale of 1:63.000. In contrast, nearly all of the conterminous United States is mapped at this scale. The status of geologic mapping and the understanding of our natural resources is analogous to that of the lower 48 one hundred years ago. Could we have made prudent policy decisions with the incomplete information that we had about the natural resources of our country in 1894? The obvious answer is no. Alaska is easy to lock up because of its remoteness, the powerful feelings about Alaskan wilderness, and a lack of scientific information. Can this country afford to give the regulatory agencies that much uninformed power???

## Northern

### NCGS Field Trip
### "REMEDIATION OF SOIL AND GROUNDWATER"

BENJAMIN ROBERTS, Ph.D., P.E. and RONALD MICHELSON, R.G.
ONSITE TECHNOLOGIES

In this field trip you will visit various high-tech soil and groundwater remediation systems in operation. These systems are manufactured, installed, operated, and maintained by On-Site Technologies.

Time: 8:30 A.M. to 1:00 P.M.; March 19, 1994

Place: 1715 South Bascom Avenue, Campbell (parking lot). From Hwy. 17 exit at Hamilton Ave.; go east on Hamilton, turn right on S. Bascom to 1715.

Cost: Free - transportation, lunch, etc. on your own.

REGISTRATION FORM – REMEDIATION OF SOIL AND GROUNDWATER

Name _____

Affiliation _____

Telephone _____

No phone calls please. Reservation (deadline March 11, 1994) only by registration form to: Tridib Guha, 5016 Gloucester Lane, Martinez, CA 94553.

**Look for your 1994 – 1995 dues card in the spring issue!**

# The Sespe Oil Fields—A Possible Kinetic Accumulation with a Subthrust Source

**CLARK, Michael S., ARCO Western Energy, Bakersfield, CA,
LILLIS, Paul G., U.S. Geological Survey, Denver, CO, and
GREGORY, Glenn J., Santa Fe Energy, Bakersfield, CA.**

The Little Sespe Creek, Tar Creek, Topatopa, Foot of the Hills, and Sections 23 and 26 fields in the northern Ventura basin, California are known as the Sespe Oil Fields (Figure 1). Since 1887, these fields have produced more than 42 MMBL of oil and 51 BCF of gas from reservoirs in the upper plate of the San Cayetano thrust. Although fractured Miocene shales and sandstone of the Rincon and Vaqueros Formations were the first upper-plate reservoirs to produce oil, conglomeratic redbeds of the upper Eocene to Oligocene Sespe Formation account for 90% of the current and cumulative production (Dosch, 1967; Nulty; 1982). A few wells produce from the underlying Coldwater Formation, and one well produces from the Matilija Formation (Figure 2). Although Pliocene reservoirs produce from the lower plate of the thrust at nearby Timber Canyon and Silverthread fields, there is no subthrust production at the Sespe fields.

The first producing well in the Sespe district was drilled in 1877, but continuous production did not begin until 1887. Since then more than 450 wells have been drilled with about 280 wells currently active. The field reached a production high in 1970 of 2.6 MMBO/year and currently produces <1 MMBO/year. The only other Sespe Formation production of significance on the north side of the Ventura basin is 0.6 MMBL of oil and 0.5 BCF of gas from combined Sespe and Coldwater reservoirs at Lion Mountain field. In contrast, the Sespe Formation on the south side of the basin has produced more than 215 MMBL of oil and 480 BCF of gas from the South Mountain, West Mountain, Bardsdale, Shiells Canyon, and Torrey Canyon fields.

Four Aspects of the Sespe field complex are unusual:

- *First*, the Sespe Formation is a dual-permeability reservoir that produces from high-permeability fractures and a low-permeability matrix. Typically, fracture stimulation considerably enhances production from the Sespe and results in initial production rates of 100-500 BOPD/well (Nulty, 1982). However, these rates decline rapidly to a few barrels per day as the primary fractures are drained and the production shifts to a low-permeability (<4 md), low porosity (<11%) matrix.
- *Second*, oil gravities within the field complex decrease updip within the same oil column from >30° API in wells with reservoir depths of 6500 – 7500 ft (-4000 ft bottom-hole elevation) in the eastern part of the complex to <15° API in wells with reservoir depths of <500 ft (+500 ft bottom-hole elevation) in the western part (Dosch, 1967). This decrease in oil gravity results from near-surface biodegradation of the oils (Lillis and Clark, 1991).
- *Third*, the ability of the Sespe Formation to transmit oil decreases updip. For example, the Sespe is the main producing reservoir at Tar Creek and Topatopa fields, yet the Sespe becomes a seal at Sespe Creek where tar seeps leak oil not from the Sespe reservoir but from underlying Coldwater Formation sandstones (Figure 3). This apparent updip decrease in reservoir permeability results, in part, from a progressive updip decrease in the mobility of the oils due to near-surface biodegradation. Migration of the oils through an otherwise continuous sandstone reservoir is further hindered by near-surface tar seals and cements that partially fill fractures and block pore throats.
- *Fourth*, the Sespe Formation at the Sespe field complex—despite water injection, water disposal, tar seeps, and over a hundred years of oil production—produces considerably less water than Sespe reservoirs in other Ventura basin fields. Since the field complex is not watering out, oil-beaing fluids may be moving into the reservoirs instead of water-bearing fluids.

Historically, the Sespe oils were assumed to be derived from organic-rich (1–2% TOC) Eocene shales (Cozy Dell and Juncal Formations) in the upper plate of the San Cayetano thrust (Taliaffero et al., 1924; Bailey, 1947). However, Rock Eval pyrolysis, biomarker and isotope data indicate derivation of the oils from even more organic-rich (3–5% TOC) Miocene shales (Monterey Formation) in the subthrust plate (Lillis and Clark, 1991). If so, primary oil migration (expulsion) is required from subthrust source rocks with secondary migration through the San Cayetano thrust into overthrust reservoirs.

Tertiary oil migration is also evident since spectacular tar seeps in Sespe Gorge, three miles west of the oil fields, result from oil leaking updip out of field reservoirs. Also, tar seeps along the surface trace of the San Cayetano thrust (e.g., Timber Canyon and Silverthread fields) result from oil leaking out of subthrust accumulations and/or oil expelled by currently-generating subthrust source rocks. Essentially no trap exists between the subthrust sources and the surface tar seeps—the only barrier to surface migration being tight rocks and tar seals (Figure 3). If so, the field may be a "kinetic accumulation" in which subthrust sources supply oil to overthrust reservoirs at a faster rate than oil leaks out of the reservoirs (Clark et al., 1993). Thus, a bottleneck results, and the oil backs up to form an economic accumulation. Furthermore, oil produced from the field is continually replenished, although very slowly, by new supplies migrating in from below. Oil not produced eventually migrates to surface tar seeps and is lost.

If the Sespe fields are a kinetic accumulation with a subthrust source, then at least three implications exist for petroleum exploration. First, subthrust structures, filled with subthrust-derived oil, are potential exploration targets. Second, migration conduits connecting subthrust sources to overthrust reservoirs are also potential exploration targets. For example, fractures associated with through-going faults cutting the upper plate of the San Cayetano thrust may be filled with oil to the base of the thrust and provide production from levels below existing reservoirs. Third, the oil is in a state of migration, and kinetic accumulations are possible anywhere along the migration path. Thus, additional oil accumulations are possible between the Sespe fields and the Sespe Creek tar seeps.

### *REFERENCES*

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Dosch, M.W., 1967, Sespe Oil Field: Calif. Div. of Oil and Gas, Summary of Operations—Calif. Oil Fields, v.53, no. 1, p. 39-56.

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Nulty, G., 1982, Sespe Oil Field in (Coast Geol. Soc., eds.) Geologic guide of the central Santa Clara Valley, Sespe and Oak Ridge trend oil fields, Ventura County, California: Pac. Sec., Amer. Assoc. Petrol. Geol., Guidebook 53, p. 28-31.

Taliaferro, N.L., Hudson, F.S. and Craddock W.N., 1924, The oil fields of Ventura County, California: Amer. Assoc. Petrol. Geol. Bull., v. 8, p. 789-829.

*(Illustrations on page 6)*

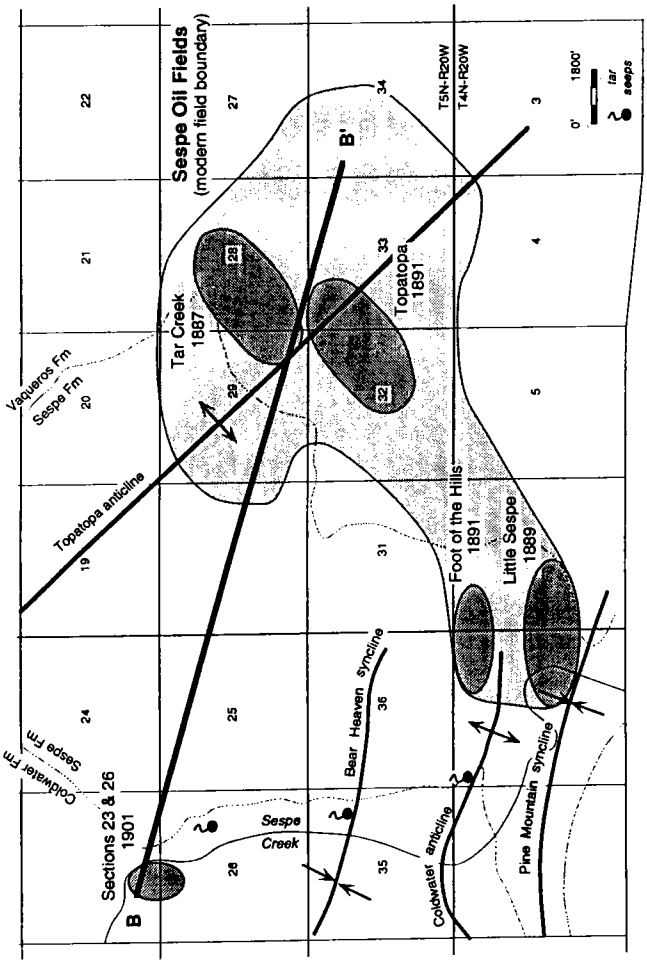



Figure 1: Map of the Sespe Oil Fields showing field discovery dates.

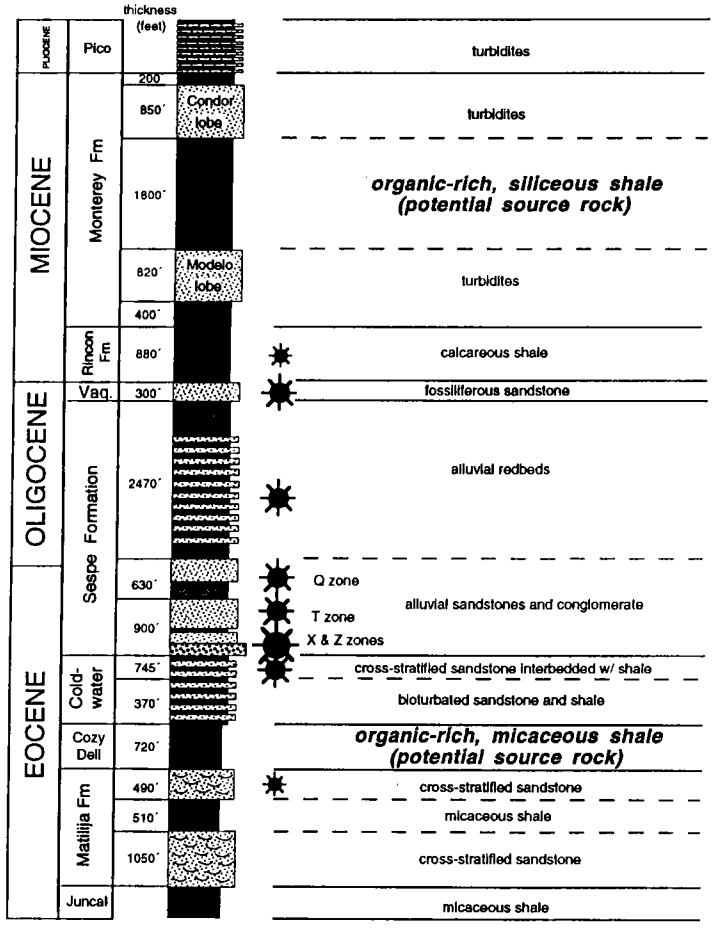



Figure 2: Stratigraphic section showing reservoirs and potential source beds.

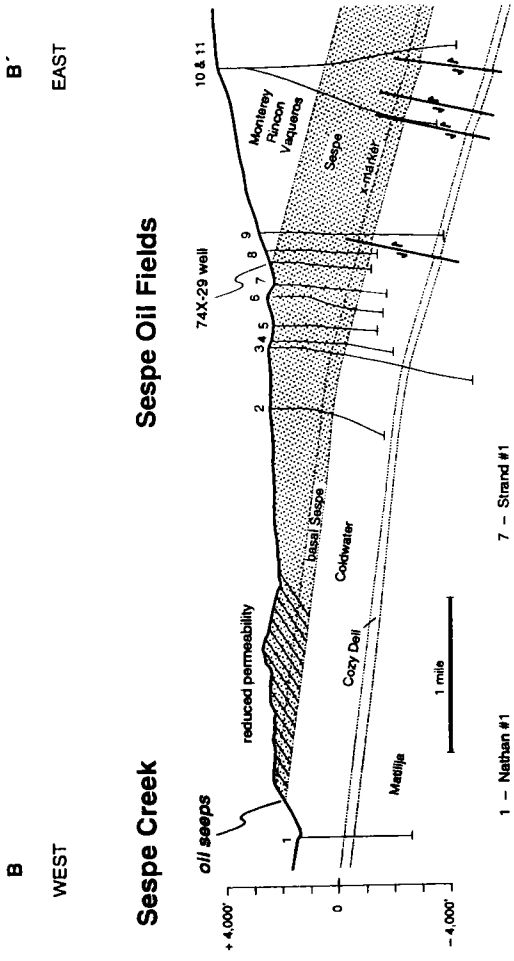
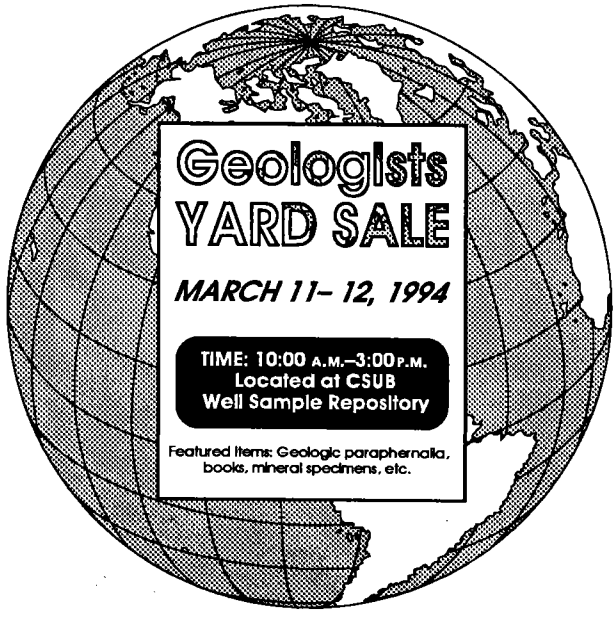



Figure 3: Cross-section of the Sespe Oil Fields.



# Joseph Le Conte

## 1908—1992

Joseph Le Conte, a well known and beloved Pacific Coast petroleum geologist and long time AAPG member passed away on Christmas Day, 1992, after a long bout with cancer. Joe was the scion of famous University of California scientists. His grand uncle, John Le Conte, was the first president of the University of California in 1869 and 1875 to 1891 as well as being Professor of Physics. Joe's grandfather was Professor of Geology at Berkeley from 1869 to 1896. Joe's father, Joseph N. Le Conte was Professor of Mechanical Engineering from 1892 to 1937. The Le Conte name is well known in the scientific world. The spectacular Le Conte Glacier in the Alaska inside passage was named after Joe's grandfather as well as Mt. Le Conte in the Sierra Nevada Mountains, a 14,000' peak near Mt. Whitney. One of the highest peaks in the Appalachians in the Great Smokey Mountain Park is also called Mt. Le Conte. Buildings, schools and streets in Berkeley and Westwood bear the Le Conte name. The Le Conte Memorial Lodge is a landmark in Yosemite National Park.

All of the Le Conte's were avid mountaineers. Dr. Joseph Le Conte was a contemporary and close associate of John Muir and helped found the Sierra Club as a charter member. His son Joseph N. Le Conte, also a charter member of the Sierra Club, was fascinated by the Sierras and spent practically every summer in the mountains, climbing many of the high peaks. His son, Joe, about whom this memorial is being written, recalled that he made his first trip to the Sierras with his father at the age of five and went with him every year after that until 1926. In 1916 they made their first trip to Yosemite by automobile. It took three days via the Big Oak Flat Road. When grandfather made his first trip in 1878 it took ten days. Now it is a 4-1/2 hour drive by freeway.

The Le Conte family developed a close friendship with Ansel Adams, the famed photographer and young Joe recalled trips that they took together in 1925 and 1926.

Joe's father was a member of a group that pioneered skiing in the United States. In 1924 there were no highways open across the Sierras in winter and the only means of travel was by one railroad. At that time Donner Pass was considered one of the greatest places to ski in the United States. The first ski lodge was a small shack 200 yards from the railroad near the summit of the pass.

Dr. Joseph Le Conte was originally an M.D., but studied at Harvard under the renowned naturalist, Louis Agassiz. He and his brother John began their teaching careers at the Universities of Georgia and South Carolina before the Civil War. When General Sherman made his march through Georgia the campus was burned to the ground and the Le Contes lost all of their possessions as well as their jobs. On the recommendations of Professor Agassiz and Professor Benjamin Silliman of Yale, they applied for and received appointments in 1868 at a new university, the University of California, which was located in Oakland, California at that time. (Later moved to Berkeley) The original group consisted of ten professors and forty students. During his tenure as Professor of Geology from 1869 to 1896, Dr. Joseph Le Conte wrote a textbook on geology. There were over 100 illustrations, all excellently drawn, but no photographs. I have seen a copy of the textbook and the illustrations are very lifelike and self explanatory. This text book, periodically revised, was used in many university geological departments throughout the country for many years.

Professor Andrew C. Lawson, Le Conte's assistant for ten years before tasking over the chairmanship of the department had this to say about his superior: here, at the University of California, his intellectual achievements were overshadowed by the great and remarkable personality of the man. His singularly sweet and simple character seemed to seize upon all who came in contact with him and bind them to him as admiring friends. He was of an exceptionally cheerful disposition and was possessed of a fund of humor that made him a sparkling and entertaining conversationalist. He was loved by the whole University and with increasing years this love became a sort of veneration, so that he was in later years of his life the veritable idol of the University community."

Professor Le Conte was the mentor of Professor Lawson who in turn taught many of the early geologists who were the pioneer oil finders in California and other parts of the country, including such AAPG members as, Clarence Moody, Walter English, Graham Moody, Clark Gester, Frank Morgan, Roy Hazzard, Mason Hill, Duke Thornburgh and others.

As a child Joe and his family lived on a secluded dead end street about a block south of the California Memorial Stadium which was built while Joe was in grammar school. He attended the Berkeley schools and entered the University of California in 1926. He started out as a chemistry major but changed to geology in his junior year, which delayed his graduation to the spring of 1931. He was a member of Zeta Psi Fraternity as were his father and grandfather.

Unlike his forebears Joe decided that he did not want an academic career. His first job was with the City of San Francisco on the Hetch-Hetchy water supply system to bring water from the Tuolumne River in the Sierra Nevada Mountains to San Francisco. This was during the Great Depression when jobs were hard to get. This was followed by a three year stint with the Tennessee Valley Authority at Chattanooga. Joe and his college sweetheart, Dorothy Teagar were married in August 1934 and went immediately to Chattangooa. His job was as an air photo compiler and cartographic engineer.

After three years Joe decided that he would rather work in private industry. He and Dorothy moved back to Berkeley and he contacted Dr. George Louderback on the University of California geological faculty. Louderback told him that the Richfield Oil Corporation was being reorganized and would have a new geological department. Joe immediately headed for Los Angeles where he was interviewed by Frank Morgan, vice-president of Richfield. Frank was a Cal graduate, Class of 1920, and had taken a course in mechanical engineering from Joe's father. Frank hired Joe on the spot and assigned him to the geophysical department headed by Drexler Dana, who was formerly with the Rio Grande Oil Co. as a geologist, but with no geophysical experience.

Joe and Drex took a crash course in geophysics from Herbert Hoover Jr., head of United Geophysical Company and Henry Salvatori, head of Western Geophysical Company. It was at this time that I first met Joe. Dorothy stayed in San Francisco with her family and Joe was assigned to Richfield's Bakersfield office. Joe got a room at Pedersen's Boarding house where I lived while working for the Superior Oil Company. Other geological patrons of the Boarding House were Tom Fitzgerald, R. Stanley Beck and Max Payne, all Richfield employees and Bill Cunningham with Bishop Oil Company. Joe's roommate was a bright young man with an unfortunate speech impediment. He stammered when talking but not when singing and after a few drinks was a fluent speaker. When engaged in conversation he spelled out words. He called Joe L-e-c-o-n-t-e and me K-i-l-k-e-n-n-e-y. In later years Joe and I reminiscently greeted each other by spelling out our names.

Richfield had several seismograph crews working in the San Joaquin and Sacramento Valley with Drex Dana and Joe supervising them. It was not long before they found an interesting anomaly just east of the great Elk Hills structure on an idea developed by Rollin Eckis. A lease was obtained from the owner, Kern County Land Company, and the first well was drilled in 1938. The crash course given by Hoover and Salvatori paid off as this well was completed as the discovery well of the giant 150 million barrel, North Coles Levee oil field.

Late in 1937, Dorothy joined Joe in Bakersfield and he moved out of the boarding house. After 1944, Joe was transferred into geology and he worked the south end of the San Joaquin Valley mainly around Wheeler Ridge where Richfield made a substantial Eocene discovery in 1952.

In the late 1940's the major oil companies including Richfield applied for permits to do seismic work offshore California. The State regulators were concerned that a half dozen seismograph crews all working offshore in the same area would kill too many fish with their explosives and severely damage the environment. As a compromise it was agreed that one crew could work the area

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with the cost and information to be shared by all participating companies, which were 17 in number. Joe was transferred to Long Beach and from that time on was involved in offshore exploration. A number of structures were found by this joint seismic effort but little was known about stratigraphy. A drilling boat, the "Rincon", was used for the purpose of drilling off–structure core holes on the ocean bottom in order to learn the stratigraphy. Joe was Richfield's representative on the boat during this early period. He became an expert in the field and in 1959 went to Talara, Peru to explore the offshore for a subsidiary of Cities Service Company, one of the large stockholders in Richfield. During this period Richfield developed underwater completion techniques and an underwater TV to help the well completion engineers.

During the 1960's, before the Atlantic Refining Co. – Richfield Oil Corporation merger, Joe worked on offshore geology and helped select the location for platforms Hope and Holly in the Santa Barbara Channel. He was also engaged in working out seismic trades with other major oil companies. Joe's final job before retiring was supervising an offshore program in the Gulf of Alaska. After retirement Joe again went to Alaska at twice the salary on a project with Mobil as operator. Joe took a few other consulting jobs after retirement and taught a night school class in geology at the University of Southern California, his only venture into the academic world.

For many years Joe and Dorothy lived in a beautiful home in Rolling Hills but in 1977 they moved to Santa Barbara, California, where Dorothy still lives.

To sum up Joe's career, he was an integral part of a great petroleum exploration team, one of the best if not the best. It was headed by Frank Morgan, Harold Hoots, Rollin Eckis and Mason Hill. Morgan and Hill were past presidents of AAPG, Honorary Members and Sidney Powers Medalists. Hoots was an Honorary Member of AAPG and Eckis was Executive Vice President of ARCO before retirement. This team came up with a giant discovery about every ten years starting in 1928 with the Elwood Field (by Rio Grande Oil Co.) under Frank Morgan, North Coles Levee in 1938, Cuyama in 1948, Swanson River in 1957 and Prudhoe Bay in 1967, the largest of them all.

Joe belonged to many organizations. He was a member of Zeta Psi Fraternity and Theta Tau while at the University of California. He was a lifetime member of the Sierra Club. He and Dorothy were members of the Santa Barbara Symphony Association, the Santa Barbara Museum of Art and the First Congregational Church. They were dedicated supporters of the University of California and were active members of the Alumni Association. Dorothy was very active in civic affairs during Joe's career.

Joe had a great sense of humor and was a "raconteur par excellence". He delighted in sending humorous post cards to his friends at home when on assignment in Alaska or Peru. He loved music, both classical and jazz and had a fondness for the piano and violin.

Joe is survived by Dorothy, his wife of 58 years, two sons, Joseph Jr. of Long Beach and John of Agoura Hills and one grandson, Jared.

Marie Clark Hill, who worked with Joe for many years at Richfield, speaking for many of us who knew him, has appropriately summed up Joe's life as follows: "He will be remembered as a fine, kind, humorous, intelligent gentleman and a "raconteur par excellence". He couldn't be otherwise coming from such an illustrious family.

Joe's son, John said the love that his father displayed and the appreciation he gave to others, his courage and his dignity were the characteristics which he would remember the most.

*— by John E. Kilkenny*

Constitution and By-laws
Pacific Section AAPG
Adopted September, 1924
*Last Amended May, 1988*

**NOTE:**
**1. Italicized lines to be deleted**
**2. Bold to be added**

# CONSTITUTION

## ARTICLE I. NAME

This organization, whose area of interest comprises the Pacific Coastal Region, shall be known as "Pacific Section of the American Association of Petroleum Geologists" and is hereinafter referred to as "this Section."

## ARTICLE II. OBJECT

SECTION 1.
The object of this Section shall be to provide for discussion of subjects and problems coming within the scope of the profession and **to advance the science of geology and the professional well-being of our members. This Section**, by such intercourse, **will** promote the advancement and aims of the America Association of Petroleum Geologists as set forth in its Constitution, By-laws and Code of Ethics.

SECTION 2.
This Section is a non-profit organization, and no portion of the financial assets inures to the benefit of any private individual or member.

SECTION 3.
**This Section may affiliate with any other geological organization in order to further its purposes and to cooperate in activities including but not limited to the annual convention, newsletter, directory, and publication sales.**

## ARTICLE III. MEMBERSHIP

*SECTION 1. ELIGIBILITY* See By-laws

*A. ACTIVE MEMBER* See By-laws, Section 2

*B. ASSOCIATE MEMBER* See By-laws, Section 3

*SECTION 2. CLASSIFICATIONS* See By-laws, Section 4

SECTION 1.

**The members of this Section shall consist of persons concerned with or furthering the professional applications of the geological sciences.**

SECTION 2.

**Various classifications of memberships and the qualifications thereof shall be established by the By-laws of this Section.**

## ARTICLE IV. OFFICERS

SECTION 1.

The officers of this Section shall be a President, a Vice-President, a President-Elect, the immediate Past-President, a Secretary and a Treasurer. The duties of these officers shall be those customary for their respective offices. They shall assume these duties at the beginning of the membership year next following their election as hereinafter provided. Their term of office shall be for one (1) year, except for the Treasurer, whose term of office shall be for two (2) years, or until their respective successors are elected. During the absence of the President, the **President-Elect** shall assume the duties. In the event of the death or resignation of the President, the **President-Elect** shall succeed to the office and title of President. Should the **President-Elect** be unable to serve in this capacity, the duties and title of President shall be assumed by (First) the **Vice-President** or (Second) the **Secretary**. In the event **of a vacancy of any office** , other than the President and immediate Past-President, the Executive Committee shall appoint **an active** member to fill the vacancy. In making such an appointment, the Executive Committee shall give due consideration to appointing a member from the nominees at the last previous election.

SECTION 2.

There shall be an Executive Committee consisting of the President, President-elect, Past President and Vice President, Secretary, Treasurer, Editor of the "Pacific Petroleum Geologist Newsletter" and one Representative selected from each associated geological society approved by the then existing Executive Committee.

SECTION 3.

**The Executive Committee shall meet at the annual meeting and at such other times during the year and at such places as designated by such Executive Committee and at the call of the President. Robert's Rules of Order shall apply at all meetings. Notice by mail of at least five (5) days shall be given to the members of the Executive Committee prior to meetings, unless waived. A quorum shall consist of seven (7) members.**

## ARTICLE V. FUNDS

SECTION 1.

The Executive Committee shall establish the fiscal year, review the financial position of this Section, and have a current financial statement available at each annual business meeting. Annual dues of this Section shall be payable in advance in an amount established by the membership at the annual business meeting. The Executive Committee shall not have authority to levy assessments against the membership and shall not have the authority to increase annual dues.

SECTION 2.

The funds of this Section shall be deposited to the credit of Pacific Section of the American Association of Petroleum Geologists in any federally insured depository selected by the Treasurer but not to exceed the limit insured by the Federal Deposit Insurance Corporation. Whenever necessary, the President shall certify to the authority of the Treasurer in administering such account by providing the depository bank with a notice of the Treasurer's selection and with true copy of this Constitution. The Treasurer shall have authority to issue checks against the bank account so established, on **the Treasurer's** sole signature, but in the event of the **Treasurer's** absence, withdrawals or payments by check may be made on the signature of the President. The identity and authority of the President and the circumstances relating to the absence of the Treasurer shall be certified to by the Executive Committee if so required by the depository.

## ARTICLE VI MEETINGS

SECTION 1.

The Pacific Section meetings shall be held annually or at other times on call of the President. If the annual meeting of AAPG is

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*(continued from page 9)*

held in California, the Pacific Section will not hold their annual meeting that year.

SECTION 2.

The time and place of the Pacific Section business meeting shall be determined by the Executive Committee.

ARTICLE VII. ELECTIONS

SECTION 1.

The President of the Pacific Section of the American Association of Petroleum Geologists, with the approval of the Executive Committee, shall appoint a nominating committee at least three (3) months prior to the beginning of the next membership year of the Pacific Section, consisting of four (4) members, two (2) of whom shall be Past-Presidents of the Pacific Section. The nominating committee shall, each year, select two (2) candidates for each of the following offices: President-Elect, Vice-President, and Secretary, and every other year shall select two (2) candidates for the office of Treasurer. The slate of the candidates shall be announced in the "Pacific Petroleum Geologist Newsletter" at least four (4) weeks prior to the election. Additional nominations may be made by written petition of twenty-five (25) or more members of the Pacific Section in good standing, received by the Secretary within two (2) weeks following the publication of the nominating committee slate of candidates. The Executive Committee shall have the authority to name an additional nominee in case of necessity, to assure two candidates for each office. Voting shall be by mailed ballot. The Secretary shall set a date for counting ballots and shall mail ballots to all members not less than three (3) weeks prior to this date.

SECTION 2.

In matters pertaining solely to the business of this Section, all active, associate and honorary members of this Section may vote. In matters pertaining to the **Advisory Council** and other official business *,and the selection of business representatives to or other officers* of The American Association of Petroleum Geologists, only members of that Association in this Section shall be qualified to vote.

SECTION 3.

This Constitution **and By-laws** may be amended by a mail ballot. Ballots concerning such amendments shall be mailed upon the authority of the Executive Committee or upon receipt by the Secretary of a Petition for Amendment signed by fifty (50) or more members in good standing. A two-thirds majority of the ballots returned and received by this Section within three (3) weeks following mailing to the membership shall be required to pass any amendment.

## BY-LAWS

ARTICLE I. MEMBERSHIP

SECTION 1. MEMBERSHIP

**Membership in this Section shall consist of the following classifications:**

**a) Active Members**
**b) Associate Members**
**c) Honorary Members**
**d) Nonmember subscribers**

SECTION 2. ELECTION TO MEMBERSHIP

**Every candidate for admission as a Member shall submit an application on an application form authorized by the Executive Committee and signed by the applicant. The Executive Committee shall be the sole judge of the eligibility of the applicant for membership and the adequacy of the applicant's qualifications. If the Executive Committee, after due consideration, judges that the applicant's qualifications meet the requirements of the Constitution and these By-laws, the committee shall cause to be published in the Newsletter or by other suitable means, the applicant's name. Any member of whatever classification who resigns, or who forfeits membership for nonpayment of dues ceases to have any rights in this Section.**

SECTION 3. DEFINITION OF TERM: "ACTIVE MEMBER"

**A member in good standing, in any classification, of the American Association of Petroleum Geologists. Any person engaged in the practice or teaching of geology who holds a degree in geological science from a college of acceptable academic standards.**

SECTION 4. DEFINITION OF TERM: "ASSOCIATE MEMBER"

**Any person not qualified for active membership who is interested in furthering the professional application of geology.**

SECTION 5. DEFINITION OF TERM: "HONORARY MEMBER"

**The Executive Committee may honor each year the accomplishments and distinguished service to this Section and profession by one or more active** members by designating Honorary Life Members. **The Active member honored must be a member in good standing, in any classification, of the American Association of Petroleum Geologists** Honorary Life Members shall be exempt from all future **Section** dues.

SECTION 6. DEFINITION OF TERM: "NON-MEMBER SUBSCRIBERS"

**Other persons, not members of the Pacific Section of the American Association of Petroleum Geologists, who are interested in the activities of this Section may subscribe to this Section's publication "Pacific Petroleum Geologist Newsletter". Nonmember subscribers shall not have the right to vote or hold office but may otherwise participate in the activities of this Section.**

ARTICLE II. COMMITTEES

SECTION 1. STANDING COMMITTEES

The Pacific Section of the American Association of Petroleum Geologists shall establish and maintain the following standing committees: Committee on Finance, Committee on Membership, Committee on Planning and Organization, Committee on Legislation and Public Affairs, Committee on Publications, Committee on Directories, Committee on Honors and Awards, and Committee on Conventions.

SECTION 2. APPOINTMENTS AND TENURE

The President shall appoint all committee chairs and co-chairs and fill vacancies whenever they occur. The committee chairs or co-chairs shall appoint all vice-chairs and members for their respective committees. The Executive Committee may remove any committee chairs or co-chairs of the Standing Committees. The chair

or co-chair may remove any vice-chair or member of their committees. The term of office of a member of a standing committee shall be one (1) year. Chairs may succeed themselves from year to year if reappointed by each succeeding President.

## SECTION 3. COMMITTEE ON FINANCE

The primary function of the Committee on Finance shall be to prepare a fiscal budget for approval by the Executive Committee. The treasurer shall serve as ex officio member and no other member of the Executive Committee shall serve as member of the Finance Committee.

## SECTION 4. COMMITTEE ON MEMBERSHIP

The primary function of the Committee on Membership shall be to encourage applications for membership and to review and act upon such applications on behalf of and with the approval of the Executive Committee.

## SECTION 5. COMMITTEE ON PLANNING AND ORGANIZATION

The Committee on Planning and Organization shall be comprised of past Officers of the Pacific Section. Their primary function shall be to assist the President in the long-range goals and objectives of this Section and any specific problems that may require their backgrounds.

## SECTION 6. COMMITTEE ON LEGISLATION AND PUBLIC AFFAIRS

The primary function of the Committee on Legislation and Public Affairs shall be to advise of Federal, State and local legislation that affects the profession and to disseminate knowledge, following Executive Committee approval, to the membership and other relevant entities about subjects within the scope of the profession.

## SECTION 7. COMMITTEE ON PUBLICATIONS

The primary function of the Committee on Publications shall be to *handle the sale and storage of publications. It may also assist in securing material for publication. The Editor of the Newsletter shall serve as ex officio member, and no other member of the Executive Committee shall serve as member of the Committee on Publications.* **advise the Executive Committee on proposed publications, estimate costs and pricing and potential sales, oversee editorial and printing processes, handle the storage and sale of the publications and maintain adequate records of costs, sales and inventory. The Chair may name a member of the committee as Managing Editor and, upon approval of the Executive Committee, the Chair may assign a number of the listed Committee functions to the Managing Editor.**

## SECTION 8. COMMITTEE ON DIRECTORIES

The primary function of the Committee on Directories shall be to update the membership directory of the Pacific Section of the American Association of Petroleum Geologists as directed by the Executive Committee. Compilation of the Directory shall be coordinated with the Society of Exploration Geophysicists and the Society for Sedimentary Geology (SEPM) and it shall be formally published as mutually agreed upon.

## SECTION 9. COMMITTEE ON HONORS AND AWARDS

The primary function of the Committee on Honors and Awards shall be to recommend to the Executive Committee recipients for all honors and awards. **All recommendations for these honors and awards by Section members or other Section Committees shall first be considered by this Committee before being presented to the Executive Committee for approval.** Following Executive Committee approval, the awards will be presented at the Annual Convention of this Section, **or the Annual Convention of AAPG if held in California.**

## SECTION 10. COMMITTEE ON CONVENTIONS

The primary function of the Committee on Conventions shall be to *submit a convention plan, and following Executive Committee approval, program and carry out this activity. Members of this Committee will include the Past-President and President-Elect.* **initiate planning for the Section's Annual Convention, advise the Executive Committee on site selection and convention budgeting, and assist each year's Annual Convention's General Chair, as requested. The Committee will also assure that appropriate accounting standards and procedures are maintained. It will compile and maintain Convention records, statistics and guidelines for use by future annual Convention General Chairs. The members of the Committee will include the Past-President, President-Elect, General Chair of the current Annual Convention; the General Chairs, when appointed, for the following three annual Conventions and the President of the host Society of the current Convention.**



☐ I hereby ratify the Constitution and By-Laws of the Pacific Section of the American Association of Petroleum Geologists (AAPG).

☐ I do not ratify the Constitution and By-Laws of the Pacific Section of the American Association of Petroleum Geologists (AAPG).

Name_____
(please print)

Signature _____

Please send this completed ballot to: Secretary, Pacific Section AAPG, P.O. Box 1072, Bakersfield, CA 93302.

## Elk Hills Deep Test

Further evaluation is in store for the deepest well ever drilled in California after initial testing in the redrilled hole yielded condensate and gas at non-commercial rates.

The record-depth well is the Department of Energy's No. 934-29R on Sec. 29, 30S-23E, Kern County, in the western portion of the Elk Hills field, which is blanketed by Naval Petroleum Reserve No. 1.

The initial test was of selected intervals totaling 249 feet in the overall interval from 16,508 to 16,918 feet in the Oceanic. Over a 5-day period, the well flowed 342,000 cubic feet of gas, 24 barrels of condensate and 118 barrels of water. On the last 24–hour run, the yield was 119,000 cubic feet of gas, 3 barrels of condensate and 10 barrels of water.

Two higher intervals in the same formation remain to be tested. Before they are perforated, more evaluation is planned for the lower interval. Injection of tracer fluid into perforated intervals and follow-up logging will be employed in an attempt to determine which of the intervals are taking fluid. If log analysis indicates lower intervals are wet, an effort will be made to isolate them and re-test upper intervals.

After spudding the exploratory well in May 1985, the Department of Energy, with Bechtel Petroleum Operations as contract operator and Parker Drilling Co.'s Rig No. 182 on location, bottomed the hole in the summer of 1987 at 24,426 feet, establishing a California depth record 1,715 feet deeper than any of the approximately 150,000 wells that had been drilled in the state since cable tools were used to put down the first oil well in Northern California's Humboldt County in 1861. En route to total depth, the Elk Hills well encountered bottomhole pressures over 18,000 psi. and temperatures above 450 degrees Fahrenheit.

The objective of the well was to evaluate deeper horizons in the Elk Hills field. Most of the oil that enabled the field to reach the 1–billion–barrel production mark in September 1992 has come from sands at about 9,000 feet, with only a small amount proved up below that depth and none produced commercially from below 12,000 feet.

The record-depth well was tested in cased hole flowing at rates as high as 151 barrels per day of 42–gravity oil and 1.4 million cubic feet per day of gas through a $^{12}/_{64}$–inch choke from 130 feet of perforated intervals in the overall interval from 17,100 to 17,365 feet in what geologists identified as the Oceanic sand. Along with oil and gas, the well flowed salt water at increasing rates, leading to a decision to suspend operations pending a redrill to get upstructure in the Oceanic at a later date.

The redrill began in June 1993, once again with Parker's Rig No. 182, and took the well to 17,566 feet. There were numerous gas shows.

If the Elk Hills deep test is successfully completed for commercial production, it will give California its deepest production. Currently, deepest production is from the Rio Viejo field, 25 miles southeast of the Elk Hills field, where Stevens sands are productive at an average depth of 14,100.

*— Bill Rintoul*
*Historical Editor*



## National AAPG Announces Honorees

Honorees for the 1994 national convention in Denver have been announced. The AAPG Executive Committee has approved the following list:

*Sidney Powers Memorial Award* – William L. Fisher.

*Honorary Membership* – Joe Cannon, M. Dane Picard, Max G. Pitcher, Robert M. Sneider, Nahmum Schneidermann and Donald S. Stone.

*Distinguished Achievement (International)* – Li Desheng (To be presented in Kuala Lampur)

*Michael T. Halbouty Human Needs Award* – George P. Mitchell.

*Public Service Award* – William K. McWilliams, Jr and Thomas W. Rollins.

*Distinguished Service Award* – Arthur M. Van Tyne, John D. Sistrunk, Jr., Edward McFarlan, Jr., Susan A. Longacre, Carl J. Smith and James P. Rogers.

*Special Commendation (International)* – Raden P. Koesoemadinata (To be presented in Kuala Lampur), Charles S. Hutchinson, Murray H. Johnstone and Khalid Ngah.

*Wallace Pratt Memorial Award* – Kevin T. Biddle,Wolfgang Schlager, Kurt W. Rudolph and Terry L. Bush.

*Robert Dott Memorial Award* – Roger W. Macqueen and Dale A. Leckie.

*J.C. "Cam" Sproule Memorial Award* – Bradford E. Prather.

*Journalism Award* – John R. Horner

## *Universities of the Pacific Section*

California State University at Bakersfield (CSUB) is a small (-5000 students) but growing institution located in Kern County in the southern San Joaquin Valley. This area is a major agricultural center and the world's largest user of ground water. It also accounts for 60% of California's oil production (if Kern County was a separate state it would rank fourth in oil production). The University opened in 1970 and the Geology program was established in 1980 (replacing an earlier Earth Sciences program.)

The Geology Department currently consists of five full-time faculty and has approximately 50 undergraduate and 15 graduate students. The program offers B.S. and M.S. degrees in applied geoscience and was designed around the needs of the local community; undergraduate students may choose between traditional or environmental options while graduate students may choose either petroleum geology or hydrology options. The department also offers a five-course post-baccalaureate certificate in hydrology. The faculty have diverse training with specializations in areas of sedimentary and environmental geology: Dr. Janice Gillespie (1992, University of Wyoming, sedimentology, physical hydrology, sedimentary geochemistry), Dr. Robert Horton (1985), Colorado School of Mines, sedimentary petrology, sedimentary geochemistry), Dr. Steven Mitchell (1980, George Washington University, stratigraphy, paleontology, geoarchaeology, environmental geology), Dr. Robert Negrini (University of California at Davis, geophysics, tectonics, paleomagnetism), and Dr. Geoffrey Thyne (1991, University of Wyoming, aqueous and organic geochemistry, contaminant hydrogeology). Most of the faculty also have industrial experience.

The department has the following research facilities: quantitative X-ray diffractometer, scanning electron microscope (with energy-dispersive spectrometer), photomicroscopy lab (including cathode-luminescence, epi-fluorescence, and quantitative-reflectance), sedimentology lab, paleomagnetism lab, geophysics lab (including refraction seismometer, gravimeter, and magnetometer), water chemistry lab, computer lab, and seismic monitoring station. The California Well Sample Repository, housing samples from 4200 wells, is located on the CSUB campus and has a close working relationship with the department. The department also has extensive teaching collections donated by individuals and industry.

Research in the geological sciences at CSU Bakersfield covers a wide range of topics related to processes affecting sedimentary basins. General areas of faculty research include sedimentology/sedimentary petrology and basin analysis, organic and low-temperature geochemistry, micropaleontology, structural geology, geophysics and paleomagnetism, hydrogeology, computer applications in geology and geoarchaeology. Students are involved at both undergraduate and graduate levels. Recent thesis research has included groundwater investigations near Lake Isabella, structural investigations in the southern San Joaquin Valley oil fields, paleomagnetic and paleoclimate studies of Quaternary lacustrine sediments of the Great Basin, sedimentology and sequence stratigraphy of San Joaquin basin reservoir rocks, Recent sedimentology of central California coastal areas and the Bahamas, structural evolution of the southern Atlantic ocean, and toxic species in San Joaquin Valley aquifers. Research funding in recent years has come from the National Science Foundation, Petroleum Research Fund, Center for Field Research, Foundation for Field Research, and private industry.

For more information contact;

Robert Horton, Chair
Department of Physics and Geology
California State University
9001 Stockdale Highway
Bakersfield, California 93311-1099
(805) 664-3059

## NCGS 50th Anniversary Celebration

On Saturday evening, December 12, 1993, NCGS celebrated its 50th anniversary in grand style at the Museums at Blackhawk. As part of the festivities, Bob Lindblom, on behalf of the American Association of Petroleum Geologists, presented a commemorative plaque. Following is the text:

Whereas, the Northern California Geological Society, an affiliate of the American Association of Petroleum Geologists, is celebrating its fiftieth anniversary; and Whereas, the Northern California Geological Society has made, and continues to make, contributions of exceptional merit to the scientific and professional interests of petroleum geologists in California and beyond; Be it resolved by the Executive Committee of the American Association of Petroleum Geologists, on behalf of the membership of the Association, that the Northern California Geological Society be congratulated on the occasion of its fiftieth anniversary and commended for the excellence of its past and continuing contributions to our science and profession."

The celebration was highlighted by a talk by long standing member Gordon Oakeshott, retired State Geologist. Gordon, a founding member of NCGS, reflected on Northern California geology and the history of NCGS. Additional geological entertainment was provided by Ray Pestrong of San Francisco State University.

A special award was presented to Gordon Oakeshott in recognition of his service to NCGS and California geology. Gordon's presentation at the 50th anniversary and his receipt of the award were only two weeks before his unexpected death. The award may be presented in the future to members who distinguish themselves through service to the society and/or California geology, and will be known as the Oakeshott Award.

— Janet Murphy
Secretary, NCGS

## In Memory of Gordon Oakeshott

The Northern California Geological Society bids a sad farewell to one of our earliest members – Dr. Gordon Oakeshott. Gordon had been a member of our society for over 40 years and was still actively participating in the society up until his death. He delighted the society with accounts of early years of the NCGS at our 50th anniversary celebration in December. Gordon was the first official president of the society in 1955 following the society's formal association with the AAPG and the Pacific Section. His presence and insightful questions and comments will be missed at our meetings.

Gordon was born in Oakland, California in 1904 and was just 18 months old when the earthquake of 1906 struck the Bay Area. He was a proud survivor of the "Big One" and enjoyed humorous anecdotes of the event. He received his B.S. (1928) and M.S. (1929) degrees in geology from the University of California in Berkeley under Professor Andrew C. Lawson. In 1936 he wrote the first Ph. D. dissertation awarded in geology by the University of Southern California on the geology of the San Fernando Quadrangle in the western San Gabriel Mountains.

Dr. Oakeshott had a 25–year distinguished career as Deputy Chief of the California Division of Mines and Geology from 1948 until his retirement from state service in December 1973. Gordon served under Division Chiefs Olaf Jenkins and Ian Campbell, and the modern state geological survey was built under his tenure. He was a member or honorary member of several dozen professional geological societies, and served as an officer, chairman, or organizer of many geological commissions, panels, boards and conventions. As a prolific geological author, he wrote many articles and books on California Geology, seismic hazards, and engineering geology. His broad career spanned three completely different realms of geology: 25 years of government service, academic teaching for 18 years at Compton Junior College, and two decades of consulting engineering geology. Dr. Oakeshott was both a California Registered Geologist #14 and Certified Engineering Geologist #9, as well as an AIPG Certified Professional Geologist #45: the low serial numbers indicate an honorary professorial leadership role. He continued professional geological work for 20 years after his formal state retirement. His autobiography entitled *My California* was recently published. His career summary was published in a cover story of the January 1974 issue *California Geology.*

## New Members

**COAST GEOLOGICAL SOCIETY**

**Michael J. Barminski**
Ventura

**Craig D. Prentice**
Ventura

**Lori E. Prentice**
Ventura

**Melinda S. Mayes**
Camarillo

**Lance J. Lawhon**
Ventura

**William A. LaChapelle**
Thousand Oaks

**SAN JOAQUIN GEOLOGICAL SOCIETY**

**William A. Hunter**
Denver

**Gregory R. Millikan**
Ventura

**L.A. BASIN GEOLOGICAL SOCIETY**

**Ludmilla Ahtam**
Palm Springs

**NORTHWEST GEOLOGICAL SOCIETY**

**Dan E. Wermiel**
Portland, OR

Do you know someone who could be a member of the Pacific Section AAPG and is not? A professional society flourishes through the participation of its members. Lend a hand by helping someone join. To obtain membership forms write to: **Membership Secretary, Pacific Section AAPG, P.O. Box 1072, Bakersfield, CA 93302** or call **Betty Bean** at (805) 395-5353.

### EXPERTS SOUGHT ON BAY MARGIN HYDROGEOLOGY

A special symposium on San Francisco Bay Margin Hydrogeology is planned for the 1995 AAPG Pacific Section Convention, which will be held in San Francisco. If you can help organize such an event and/or solicit speakers, please contact Mary Rose Cassa at (510) 540-3818 or Tom Wright at (415) 456-9244.

## Recommended Reading...

**AAPG BULLETIN**
Vol. 77, No. 7 (July 1993)

Methane in Columbia River Basalt Aquifers: Isotopic and Geohydrologic Evidence for a Deep Coal–bed Gas Source in the Columbia Basin, Washington, V.S. Johnson et. al., page 1192.

Vol. 77, No. 9 (Sept. 1993)

Prediction of Oil Gravity Prior to Drill-Stem testing in Monterey Formation Reservoirs, Offshore California, D.K. Baskin, et. al., page 1479.

Redox Reactions Involving Hydrocarbons and Mineral Oxidants: A Mechanism for Significant Porosity Enhancement in Sandstones, Ron C. Surdam, et. al., page 1509.

Vol. 77, No. 10 (Oct. 1993)

Evolving Fluvial Style in the Kekiktuk Formation (Miss.), Endicot Field Area, Alaska: Base Level Responce to Contemporaneous Tectonism, J. Melvin, page 1723.

**BOOKS**

Geology Underfoot in Southern California by R.P. Sharp & A.F. Glazner, Mountain Press, Missoula; 224 pages, $12.00

**GEOLOGICAL SOCIETY OF AMERICA BULLETIN**

Vol. 105, No. 9 (Sept. 1993)

Upper-Crustal Structure Beneath the Columbia River Basalt Group, Washington: Gravity Interpretation Controlled by Borehole and Seismic Studies, R.W. Saltus, page 1247.

Vol. 105, No. 10 (Oct. 1993)

A New Angle on the Tectonic Evolution of the Ridge Basin a "Strike–Slip" Basin in Southern California, S.R. May et. al., page 1357.

**GEOLOGY**

Vol. 21, No. 8 (Aug. 1993)

Stratigraphic Solution Sets for Determining the Roles of Sediment Supply, Subsidence, and Sea Level of Transgressions and Regressions, P.L. Heller, et. al., page 747.

Vol. 21, No. 10 (Oct. 1993)

Relations Between Monterey Formation Deposition and Middle Miocene Global Cooling: Naples Beach Section, California, B.P. Flower, et. al., page 877.

**U.S. GEOLOGICAL SURVEY**

Open-File Report 89-0450-C. Petroleum Geology of the Santa Maria Basin assessment Province, California for the 1987 national assessment of Undiscovered Oil & Gas Resources, C.M. Isaacs, et. al.

Open–File Report 92-0539-A. Preface to Preliminary Geology Reports for the Cooperative Monterey Organic Geochemistry Study, Santa Maria and Santa Barbara–Ventura Basins, California, C.M. Isaacs, et. al.

Open–File Report 92-0539-B. Preliminary Geologic Backgound for Rock Samples from Naples Beach and Lions Head in the Cooperative Monterey Organic Geochemistry Study, Santa Maria and Santa Barbara–Ventura Basins, California, C.M. Isaacs, et. al.

Open–File Report 92-0539-C. Preliminary Data on Rock Samples (KG-1 to KG-24) in the Cooperative Monterey Organic Geochemistry Study, Santa Maria and Santa Barbara–Ventura Basins, California, C.M. Isaacs, et. al.

Outside Publication 24. Hydrologic Monitoring for Effects of Geothermal and Ground-water Development, Long Valley Caldera, California; C.D. Farrar et. al., in Proceedings of the Symposium on Subsurface Injection of Geothermal Fluids. Oklahoma City, OK: Underground Injection Practices Council, 1990. pages 157–171.

Outside Publication 26. Ground-water Basins Along the Eastern Sierra Nevada; Tectonics, Water and Politics by W.R. Danskin, et. al. in Geological Excursions in Southern California and Mexico, pages 447–473, (M.J. Walawender et. al.) Sand Diego State University 1991.

Outside Publication 33. Groundwater Flow and Solute Movement to Drain Laterals, Western San Joaquin Valley, California; 1, Geochemical Assessment, S.J. Deverel et. al., in Water Resources Research, vol. 27, no. 9, Sept 1991. pages 2233–2246.

Outside Publication 44. Groundwater Flow and Solute Movement to Drain Laterals, Western San Joaquin Valley, California; 2, Quantitative assessment, J.L. Fio et. al., in Water Resources Research, vol. 27, no. 9, Sept. 1991. pages 2247–2257.

Outside Publication 39. Seismotectonics of Southern California, L.K. Hutton et. al., in Neotectonics of North America. (D.B. Siemmons, editor and others), in the Collection; The Decade of North American Geology Project Series. Boulder, CO: Geol. Soc. Am. 1991. pages 133–152.

**WATER RESOURCES RESEARCH**
Vol. 29, No. 4 (1993)

Percolation Theory, and its Applications to Groundwater Hydrology. Kerkowitz, B. et. al., pages 775–794.

## Delegate's Corner

As we enter the new year, the news in the oil patch is less than optimistic: the majors continue to reorganize and downsize while falling crude prices put the squeeze on independents. Sadly, the result is that geoscientists continue to lose their jobs. Some of these displaced professionals return to the university to upgrade their degrees or obtain training in other areas. This inevitably strains finances, causing these re-entry students to look very hard at whether or not to continue their memberships in professional organizations. The AAPG is sympathetic to the plights of such people and has modified its dues structure to accommodate them. Active members who have returned to school as full-time students may retain their active status but at the reduced student rate of $10 per year. All that is needed is to send a note to AAPG which explains their situation, including how long they expect to be in school, and which has been endorsed by their faculty advisor or the department chair. This note can even be sent by FAX. These letters should be sent to:

AAPG Membership Dept.
P.O. Box 979
Tulsa, Oklahoma 74101

FAX: 918-584-0469

Once the request is received and approved the AAPG will make the necessary changes. If you have additional questions, contact the AAPG Membership Department at (918) 584-2555.

*—Bob Horton*
*Delegate SJGS*

## Candidates for Office Selected

The following people have been nominated as candidates for office – Pacific Section – AAPG, 1994–1995:

President-Elect:
**Don Clarke**, City of Long Beach
**Mark Wilson**, Bechtel Petroleum

Vice President:
**Larry Knauer**, Bechtel Petroleum
**John Howe**, Archer Exploration

Secretary:
**Laura Bazely**, WZI, Inc.
**Pat Herrera**, Herrera International

Photographs and biographies of the candidates will be published in the next issue (Spring, 1994). Ballots will also be included for you to vote for the new officers.

## COMING EVENTS...

The triennial U.S. Geological Survey Open House will take place on Saturday and Sunday, May 21 and 22, 1994, from 10:00 A.M. To 4:00 P.M. Location: Western Region Center, 345 Middlefield Road, Menlo Park, California. For more information, phone (415) 329-5000.

## 1994 PETROLEUM PROSPECT FAIR SLATED FOR DENVER

The American Association of Petroleum Geologists is encouraging prospect generators to exhibit their prospects at the 79th annual meeting, to be held in Denver, Colorado, June 12 – 15, 1994.

Commercial exhibit space is available on a contract basis both in the Exhibits and Session areas. A Deal Room will also be furnished to accommodate prospect showings and appointments, and a bulletin board will be available for posting Executive Summaries of prospects.

For more information, please contact the AAPG Convention Department, P.O. Box 979, Tulsa, OK, 74101, telephone (918) 584-2555.

**Is there a red dot next to the address label on your newsletter??**

If so, that means the Pacific Section has not received your 1993–1994 dues...and boy, are they late! It is possible that you sent them in but we did not receive them due to an incident with someone at the post office helping themselves to our mail.

Dues are $10.00 a year. Make a check out to the Pacific Section AAPG and mail it today. If you have any questions, please contact our Membership Secretary, Betty Bean at (805) 395-5353. Thank you.

## FIELD TRIPS

Sponsored by
Bureau of Land Management

The Bureau of Land Management has initiated a program of monthly earth science field trips to points of ecologic, geologic, paleontologic and historic interest throughout central California. These trips are designed for persons of high school age or older. It is **not** necessary to have a technical background to attend or benefit from the trips.

These field trips are recommended for teachers and many of them can be taken for in-service continuing education credit through California State University Bakersfield. Each trip includes a full spectrum of environmental and land management topics.

The field trips are conducted using buses or vans. Private vehicles are not used except in special circumstances. A field guide is prepared for each trip which includes maps and directions which can be used by anyone for self-guided investigation of the ecology along the field trip route.

To register for trips, call Dr. Gregg Wilkerson at (805) 399-6264.

### 1994 SCHEDULE

**Kern Canyon-Lake Isabella Walker Pass** – Sat., 3/5/94

**Mother Lode 94: Jamestown to Copperopolis** – Sat., 4/9/94

**Mother Lode 94: San Andreas to Garden Valley** – Sat., 5/7/94

**Bakersfield to Carpenteria** – Sat., 6/4/94

DEADLINE FOR
SPRING ISSUE
MAY 1, 1994



NEWSLETTER of the Pacific Section–American Association of Petroleum Geologists Newsletter is published quarterly by the Pacific Section. Matericl for publication, requests for previous copies, and communications about advertising costs should be addressed to THOMAS A. BERKMAN, ARCO Western Energy, P.O. Box 147, Bakersfield, CA 93302. CHANGE OF ADDRESS, subscription, and membership inquiries should be directed to: MEMBERSHIP SECRETARY, PACIFIC SECTION AAPG, P.O. Box 1072, Bakersfield, CA 93302. To order publications, write to: PUBLICATIONS COMM.: Pacific Section–AAPG, P.O. Box 1072, Bakersfield, CA 93302.

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**Pacific Section A.A.P.G.**
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# PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

*of the Pacific Section*
*American Association of Petroleum Geologists*

**SPRING 1994 No. 2**


# ELECTION ISSUE

## *President's Column*

**What a great convention!!** The convention committee, chaired by Dalton Lockman, worked tirelessly to provide the best convention in many years. Whether it was the site, the session talks, the association or the fact that the oil price had turned around, everyone I talked to seemed to have a positive disposition, including the exhibitors.

In case you are interested, we already have some statistics on the meeting and they are as follows: total registrants were 561, of which 289 were full registration and 134 were one day registrants. Forty four students were registered at the meeting as well as 56 spouses. Based on the registration forms 331 or 57% of attendees were AAPG members. This represents slightly better than 40% of the total current membership.

Associated convention activities were also successful with two of the three short courses and all field trips having sufficient registration for them to be held. We also had good attendance at the recreational activities and social events. These activities were capped by the Joint Luncheon where dignitaries and honorees were recognized and an interesting biographical talk was given on Mulholland. Ventura and the Doubletree Inn will certainly need to be remembered the next time the convention returns to the central coast.

As you open this newsletter, you will see a card centerfold — on which is the membership card and ballot. This format has been created to be an eye catcher and to make it easier for you to vote and renew your membership. Take the time right now, won't you, to **vote** for one of the candidates nominated for each office – they deserve your consideration. Once that is done, **fill in the blanks on the registration form and send it to the membership secretary** — do it now! Oh, and **don't forget a check for $10.00**, still the best dues deal anywhere! **Thanks!!**

*– Reinhard J. Suchsland*
*President*

In Memorium

## WESLEY E. ELLIS
1928 — 1994

On or about April 11TH, Wes passed away due to cardiovascular complications.

Wes was born and raised in Whittier, CA. Upon his discharge from the U.S. Navy, he attended Whittier College where he played football under George Allen. In 1954, he graduated with a B.A. Degree in Geology.

Wes went to work for Peters Formation Logging in 1954. It was the Peters organization which fathered a majority of the ensuing mudlogging service companies. In 1957, Wes became a partner in the Pacific Oil Well Logging (PacOWL) firm. He remained with PacOWL until 1962. Upon his return from a work assignment in the Spanish Sahara, Wes went to work for Bob Burns at Geological Exploration (GX). Wes served GX for nearly 30 years and was often the mudlogger of choice during the early years of drilling in the Santa Barbara Channel and the discovery and following development by Standard Oil in the Asphalto field. He was very involved with Texaco and Tenneco discoveries and development of the Yowlumne, Rio Viejo and Landslide field, along with the initial start up and drilling on the Elk Hills Naval Petroleum Reserve. Upon the sale of Geological Exploration to Epoch Well Logging in October of 1991, he basically went into retirement.

Wes is remembered for his very easy- going nature and a marked professionalism of perfectionism he brought to the job. Most of all his shaved head and fu man chu mustache made him a very recognizable and imposing figure. He brought much to the early mudlogging profession and will be sorely missed.

*— Les Collins*

# CANDIDATES FOR PRESIDENT-ELECT

## Donald D. Clarke

*Present Position:*
Chief Geologist-Division Engineer of SubsidenceControl, Department of Oil Properties, City of Long Beach, CA
Geology Instructor, Compton Community College, Compton, CA

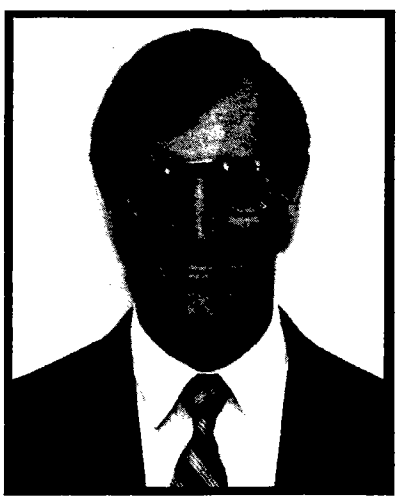
*Education:*
1972-California State University, Northridge, B.S. Geology
1972-1974-joint Masters Consortium in Geology, CSUN, CSULA, LBSU

*Employment:*
1974-1978: Energy and Mineral Resources Engineer; California State Lands Commission
1978-1981: Associate Mineral Resources Engineer; California State Lands Commission
1981: Senior Geologist; California State Lands Commission
1981-1992: Senior Geologist; Department of Oil Properties

*Professional Activities:*
1987 - National Delegate for AAPG, Editor "Geologic Field Guide to the Long Beach Area"; Editor "Computer Mapping for Petroleum Geologists", PSAAPG; Field Trip Leader and Short Course Instructor, National AAPG Convention
1989 - Program Editor and Session Chairman, Pacific Section AAPG Convention
1992 - Author, "The Gridded Fault Surface" in Computer Modeling of Geologic Surfaces and Volumes, AAPG
1993 - General Chairman, Pacific Section AAPG Convention

*Memberships*: AAPG, Pacific Section AAPG, DEG, Pacific Section SEPM, AGU, GSA, AAAS, SPE, LABGS and SCWLS.

California Registered Geologist #3583



## Mark L. Wilson

*Present Position:*
Senior Geologist, Bechtel Petroleum Operations Inc.

*Education:*
1970 - University of Utah, B.S.

*Employment:*
1970-1981: Various employers, mineral exploration Western U.S.
1981-1982: Gulf Mineral Resources, Bakersfield District
1982-1985: Gulf Oil Corp., Bakersfield District

*Professional Activities:*
1982 - Co-authored "Geology of the Airox Oil-saturated Diatomite Deposit"
1984 - Co-authored "The Markley Submarine Valley and its Stratigraphic Relationships"
1990 - Co-authored "Field Trip Stops at Elk Hills Oil Field"
1991 - Regional AAPG "The Use of Wireline Pressure Measurements to Refine Reservoir Description, Main Body 'B' " (presentation)
1991 - Regional SPE Co-authored "Performance of a Peripheral Waterflood Project in the Main Body 'B' "
1993 - SJGS "The Latest Billion Barrel Field - Elk Hills" (presentation)
1993 - Regional AAPG "Geology of the Main Body 'B'/Western 31S Waterflood "
1993 - API "Elk Hills at a Billion Barrels, the Continuing Role of Geology"

# CANDIDATES FOR VICE PRESIDENT

## John W. Howe

***Present Position:***
President, Archer Exploration, Inc., Bakersfield
***Education:***
1977 - Illinois State University, B.S. Geology
***Employment:***
1978-1979: Engineering Technician/Geologist, Balsamo Olsen Engineering
1980-1981: Exploration Geologist, Conoco, Inc., Texas
1981-1983: Production/Exploration Geologist, Cities Service Oil and Gas Company, California and Alaska
1983-1987: Exploration Geologist, OXY, USA Inc., Bakersfield
***Professional Activities:***
1988 - Dibblee Field Trip coordinator, Pacific Section AAPG Convention, Santa Barbara
1991 - Barbecue Committee, Pacific Section AAPG Convention, Bakersfield
1991 - Golf Tournament Committee, San Joaquin Geological Society
1992-1993 - Secretary, Pacific Section AAPG
1993 - AAPG Divison of Professional Affairs, Pacific Section Representative

## Larry C. Knauer

***Present Position:***
Senior Geologist, Bechtel Petroleum Operations Inc., Elk Hills, CA.
***Education:***
1976, Whittier College, B.A. Geology
1982, UCLA, M.S. Geology
***Employment:***
1982-1986: Gulf Oil Corp./Chevron U.S.A., California
1987-1989: California Well Sample Repository, Cal State University Bakersfield
***Professional Activities:***
1988-1989 - Secretary, SJGS
1989 - Short course coordinator Pacific Section Convention.
1989-1990 - Treasurer, SJGS
1990-1991 - Vice President, SJGS
1991-1992 - President Elect, SJGS
1992 - Organized seminar on horizontal drilling in California, AAPG publication MP42
1992-1993 - President, SJGS
1994 - Publications Chariman, Pacific Section AAPG
1994 - Co-Editor, Pacific Section AAPG Newsletter
California Registered Geologist #4385

# CANDIDATES FOR SECRETARY

## Laura M. Bazeley

***Present Position:***
Manager, Geology, WZI Inc.
***Education:***
1975 - State University of New York at Binghamton, B.S. Geology
1978 - University of Delaware, M.S. Geology
***Employment:***
1979-1982: ARCO Oil and Gas, Geologist
1982-1986: ARCO Exploration, Geologist
1986-1987: Consulting Geologist
***Professional Activities:***
1988–1991 - Newsletter Editor, Pacific Section AAPG
1991–1992 - Secretary, SJGS
*Memberships*: AAPG, Pacific Section AAPG, Division of Environmental Geology, Air and Waste Managment Association
California Registered Geologist

## L.J. "Pat" Herrera

***Present Position:***
President, Herrera International
***Education:***
1949, University of California, Berkeley, B.A. Geology
1951, M.A. Geology
***Employment:***
1951-1955: Shell Oil Co., Ventura and Ely, Field Party Leader
1955: Cabeen Exploration Corp., Albuquerque and Oklahoma City, Uranium and Petroleum Exploration Geologist
1956-1962: Cabeen Exploration Corp., Lima, Peru, South America Exploration Manager
1962-1967: Cabeen Exploration Corp., Vice President, North Hollywood
***Professional Activities:***
1979 - Co-Chairman Technical Papers, Pacific Section AAPG Convention, Anaheim
1979-1982 - Delegate, LABGS to AAPG,
1987 - Registration Chairman, AAPG National Convention, Los Angeles
1989 - Registration Chairman, Pacific Section AAPG Convention, Palm Springs
1993 - Registration Chairman, Pacific Section AAPG Convention, Long Beach
*Memberships*: AAPG and CIPA

# AWARDS PRESENTED AT PACIFIC SECTION CONVENTION

At the Pacific Section Annual convention in Ventura April 27– 29, four of our distinguished members received awards.

Honorary Life Memberships were given to Melvin J. Hill of Corona Del Mar, Ted Off of Ojai and Bill Edmondson of Bakersfield.Edmondson, a consulting geologist, is well known for his work in the Sacramento Valley especially in regard to Paleogene submarine channels. (The citations are listed below and on page 6.)

Dr. Arthur Sylvester, professor of Geology at the University of California, Santa Barbara received the Special Education Award.

Martin Van Couvering Awards were presented to four students. They are Arturo Orozco of California Lutheran University, Peter Rumelhart of UCLA, John Truschel of California State University, Northridge and Erick McWayne of University of California, Santa Barbara.

*— John Kilkenny*
*Chairman, Honors and Awards*

## TED OFF
## HONORARY LIFE MEMBER
## PACIFIC SECTION – AAPG
## CITATION BY BILL KENNETT

Ted was born in Los Angeles in 1928. He entered Stanford in 1946 as a major in Aeronautical Engineering but after exposure to Ben Page, Levorson and others, he found oily rocks to be more interesting. He received his M.S. in Geology in 1950 and began his professional career with Union Oil Company. When the Korean War started, he married his college sweetheart, Mary Ann Green. His first two years of marriage were on an LST ferrying troops and sundry between Japan and Korea. Armed with a G.I. bill and a fellowship Ted, Mary Ann and baby, departed for Princeton to fulfill his lust for a Ph.D.

Meantime, Ojai Oil Company, discovered the other half of South Mountain missed by Texaco. With money rolling in, Ojai needed someone to spend it. Ted was the guy, he has worked for Ojai since 1953. Ted's adopted philosophy is 'the first object is not to make money–it is to exist!' The company has survived because of diversification. Along with a few oil wells, the company now manages 7 self-serve warehouses, a car wash and a mobile home park.

Ted's voluntary contributions to his profession are impressive. Soon after settling in Ventura he was slide projector operator of the Coast Society. He has conducted field trips, edited guide books and publications and served on x-section committees and on national committees. He was Vice President of the Pacific Section in 78-79 and President in 82-83. He also served as President of the California Section of AIPG in 1976.

In 1981, the Pacific Section agreed to co-sponsor the national convention in San Francisco – resulting in a windfall to the Pacific Section. With Ted as President in 1982, the executive committee agreed to contribute $20,000 as a start for the Dibblee Foundation. Ted has served as treasurer of the foundation since it began 10 years ago. He has given significant personal monetary contributions. While it is obvious that there would be no Dibblee Foundation without Tom Dibblee, there is no question in my mind that much credit is due to Ted Off in making Tom's tremendous work available to all of us and to those that follow.

## MELVIN J. HILL – HONORARY LIFE MEMBER PACIFIC SECTION AAPG CITATION BY PETER H. GARDETT

I have the privilege and the pleasure of presenting a geologist who personifies consistency and achievement. A man that I met well over 50 years ago here in the Ventura Basin.

This member of the Pacific Section was born in California, graduated from the University of California and worked and lived in California during the first 15 years of his career.

He had one employer, Gulf Oil and remarkably during all of the years of his absence from the west coast he maintained active interest and membership in the Pacific Section AAPG.

During his career with Gulf, he was in Bakersfield as district geologist and in Los Angeles as chief geologist for Western Gulf. In 1956, he was transferred to Pittsburgh and while assigned to the Research and Development Group, he helped to design and sell to management, the GULF REX, one of the first combined seismic, magnetic, gravity ships used in offshore exploration worldwide. Subsequently, also with his input, GULF replaced the REX with a greatly refined and much more sophisticated ship, the HOLLIS HEDBERG.

In 1970, he was elected as GULF's worldwide coordinator for exploration and production and in 1972, became a vice president of the company.

In 1975, with GULF's headquarters in Houston, he was named president of GULF Energy and Minerals International. Then in 1981, he was made Executive Vice President of GULF OIL CORP. the position he held when he retired as a result of the GULF-CHEVRON merger. For a year or more, he was retained as an advisor during this process.

He returned to California and now lives with his charming wife Daphne in Newport Beach.

This short career summary demonstrates consistency and achievements that have, for over fifty years, reflected honorably on our profession and on this organization.

I welcome this opportunity to present to you, Mel Hill, whose heart and loyalty never left California nor the Pacific Section AAPG and who continues to be fascinated by the contentious backbone of our Coast Range the FRANCISCAN Assemblage.

## WILLIAM F. EDMONDSON
## HONORARY LIFE MEMBER
## PACIFIC SECTION – AAPG
## CITATION BY HENRY WALROND

Bill was born in South Pasadena, CA and attended California Institute of Technology graduating with a B.S. in Geology in 1952.

In June of 1952, he was employed by Superior Oil Co. in Bakersfield as an exploration geologist, working mainly in the Sacramento Valley. He enlisted in the U.S. Navy in 1954 and returned to Superior in 1957. He resigned from Superior in 1959 and became a Consulting partner with Howard Reynolds, Jr. until 1973. In 1974 and 1975 he was a consultant for Westates Petroleum Co. From 1976 to 1980 he was a partner and part owner of Mariposa Petroleum Co. From 1981 to the present he has consulted for various operators in the Sacramento Valley.

He has been an active member of the AAPG since 1959.

As a consultant, he has been instrumental in finding gas in many areas of the Sacramento Valley. When the Grimes Gas Field was discovered in 1960, Bill and his partner had under lease approximately 6700 acres in the Grimes and Sycamore areas. Besides Grimes and Sycamore, Bill has been involved in gas discoveries in North Conway, West Millar, Todhunters Lake, Putah Sink and other lesser fields.

Bill served as Vice-President of the San Joaquin Geological Society, Secretary of the Pacific Section AAPG, Vice-President of the Pacific Section AAPG and President of the San Joaquin Geological Society.

In addition, he was program chairman for the 1965 Pacific Section AAPG meeting, was Editor or Co-Editor of several Sacramento Valley AAPG publications, and has twice been Program Coordinator for the Pacific Section Annual Meeting.

Bill has always been respected for his integrity by his colleagues and has had a distinguished career in our industry and our association for over 40 years.

Bill moved to Colorado Springs two weeks ago and will continue to work as a Consulting Geologist in the Sacramento Valley from Colorado Springs.

I am honored to present Bill with an Honorary Membership in the Pacific Section AAPG.

## ART SYLVESTER
## RECIPIENT OF THE SPECIAL EDUCATION AWARD
## PACIFIC SECTION – AAPG
## CITATION BY JOHN C. CROWELL

Today, we honor Art Sylvester for his excellence in teaching geology, and especially to those students who have gone into the petroleum field. His teaching philosophy is to get student to think, and to piece together careful observations before arriving at an interpretation. For over 26 years, he has been successful in these goals, and has taught many undergraduate and graduate students – in the field and in his courses and seminars in structure and tectonics. In facing a problem, Art leads students to ask appropriate questions, and discusses with them the methods needed to find answers. But the students must think and find the answers themselves under his guidance.

Over the years, he has gathered enthusiastic groups of undergraduates around him, working WITH him and not FOR him, on tectonic studies leading to publication. Many students have gone on to the petroleum industry. They are unusually able to observe critically, to record the observations systematically, and to reason logically to a documented conclusion. Good writing and clear illustrations are essential. He has also reached many professional petroleum geologists through short-courses and field seminars and lectures for the AAPG and major oil companies.

Art is a southern Californian, educated at Pomona College and UCLA. I know him well and can assure you that he is both a fine geologist and a fine teacher. His many students – some of whom have risen high in the petroleum field – attest that he guided them in right directions. He deserves the accolade we place upon him today!

## *Alaska*

No report.

Alaska Geological Society
P.O. Box 101288
Anchorage, AK 99510

## *San Joaquin*

June meeting to be announced.

The meetings are held at the American Legion Hall at 2020 "H" Street in Bakersfield. Attitude adjustment starts at 6:00 p.m. and dinner is served at 7:00 p.m. For more information and reservations, please contact Mike Clark at (805) 632-6254.

SJGS OFFICERS —1994 –1995

| | |
|---|---|
| *President - Elect* | Frank Cressy |
| *Vice President* | J. Scott Hornasius |
| *Secretary* | Allen Britton |
| *Treasurer* | Mike Clark |

## *Sacramento*

May talk on the twenty-fifth, Les Magoon, U.S. Geological Services, Natural Migration Systems in the Sacramento Valley.

**S.P.A. GOLF TOURNAMENT**
**Southridge Golf Club, 9413 S. Butte Rd.**
**Sutter, CA 95982 — (916) 755-4653**
Wednesday, June 1, 1994
Shotgun Start at 12:00 NOON
Check in by 11:30 A.M.
Golf Prizes to SPA Members only
Dinner at 6:00 P.M.
*Golf & Dinner - $50 (incl. cart)*
*Golf only - $35 (incl. cart)*
*Dinner only - $20*
*Hole Sponsor - $50*
For more information, call Charlie Fry at (916) 481-2840.

## SEPM 1994-1995 OFFICERS

| | |
|---|---|
| *President* | Joel P. James |
| *President Elect* | Léo F. Laporte |
| *Secretary/Treasurer* | Steven C. Driese |
| *Research Councilor* | Michael A. Arthur |

The following members of council are continuing from 1993:

*Councilor for Paleontology*
Carlton Brett
*Councilor for Sedimentology*
David A. Budd
*Editor, Jounal of Sedimentary Petrology*
John B. Southard
*Editor, Special Publications*
Peter A. Scholle
*Editor, PALAIOS* David J. Bottjer

## Coast

Date: *Tuesday, May 17, 1994*
Location: *American Legion Hall, 83 S. Palm Street, Ventura, CA*
Time: *6:00 P.M. - Social*
*7:00 P.M. - Dinner*
Cost: *$12.00 with reservation*; $15.00 w/o reservation, $5.00 students*
Speaker: *EUGENE FRITSCHE CSU at Northridge*
Topic: *"Middle Tertiary Sedimentary Relationships Between the Santa Ana and Santa Monica Mountains as Related to the Development of the Los Angeles Basin".*

** Reservations are required to guarantee dinner.*

Reservations: *phone the receptionist at GroundwaterTechnology (805) 644-9811 by 10 A.M. at least one day before day of the meeting.*

## Los Angeles Basin

Date: *Thursday, May 26, 1994*
Location: *UNOCAL Center, California Room, 1201 West 5th Street, Los Angeles*
Time: *12:00 NOON*
Cost: *$15.00 with reservation; $17.00 w/o reservation, $5.00 students*
Topic: *Subsurface geology of the San Marcos Arch area, central Texas*

Reservations: *Please make your reservations by Tuesday, May 24, 1994 with Sean Carey at (310) 946-6206 or FAX (310) 946-6220. Remember to include your phone/fax number with your reservation.*

The next LABGS luncheon meeting is on *Thursday, July 21, 1994.*

### LABGS OFFICERS — 1994 -95

*President* Delos Tucker
*Secretary/Treasurer* Mark Legg
Sean Carey continues as program chairman.

## Northern California

Date: *Thursday, May 19, 1994*
Location: *Holiday Inn, 2730 North Main St., Walnut Creek*
Time: *6:30 P.M. – Social; 7:00 P.M. – Talk*
Cost: *$5.00*
Speaker: *KENT S. UDELL Berkeley Environmental Restoration Center University of California, Berkeley*
Topic: *"Steam Injection for Enhanced Soil and Groundwater Treatment"*

Reservations: *510-355-8005 (Leave your name on the NCGS recorder by Tuesday, May 17, 1994)*

### 1994 –1995 OFFICERS

*President* Richard Cardwell
*Vice President & Field Trip Chair* Tridib Guha
*President Elect* Ray Sullivan
*Program Chair* John Karachewski
*Secretary* Dan Day
*Treasurer* William Bailey
*Scholarship Chair* John Sciacca
*Councilors* Craig Lyon and Christopher Lewis



## Northwest

NWPA has 15 new members since January!

The program committee is selecting future speakers from a broad base of energy related industries so as to attract a more diversified group of new members and guests. We are interested in your suggestions and/or volunteers for speakers and topics of interest, and you can help by letting Bob Pinotti at (503) 220-2573 know of possible candidates, too!!

Our May 13 luncheon and meeting will be held in Federal Way, Washington at the Best Western Executel, 31611 20th Ave, South. Speaker for the meeting will be Tim Ise, whose topic is "Whole Bunch of Sour Grapes – or – Why We Haven't Found IT yet in Washington". Please mark your calendars for another great luncheon–and bring a friend!!

## FIRST NOTICE AND CALL FOR SPEAKERS

NWPA Fall Symposium
"Geologic Resources & Hazardous Assessment"
Continental Margin PNW
September 18–20, 1994

- Ice-breaker: Sunday, Sept. 18
- Full day of inspirational speakers & good food: Monday, Sept. 19
- Scenic geologic field trip of the North Olympic Coast: Tuesday, Sept. 20

LOCATION: Red Lion Inn, Port Angeles, Washington
Note: Ferry schedules to Victoria are available to 'significant others' upon written credit approval from sponsoring NWPA members.

Chairman: Peter Hales (206) 924-2056
Speaker Recruiter: Dave Harle (503) 245-5510
Field Trip: Dr. Al Niem (503) 737-1233

# HIGHLIGHTS OF NATURAL GAS DRILLING ACTIVITIES IN THE SACRAMENTO VALLEY OF NORTHERN CALIFORNIA DURING 1993

**Roland J. Bain**

Three Independent producers helped to stabilize the Sacramento Valley natural gas drilling industry during 1993. Montis Niger, Capitol Oil and Nahama & Weagant accounted for just under one-half of the 130 holes drilled in 1993. These three stalwart Independents drilled 59 (45%) of the holes and more important, are credited with the completion of over one-half (29) of the 57 new gas wells. Thanks to Montis Niger's very strong performance the numbers established in 1993 resulted in a measurable increase over those recorded in 1992. The 95 holes drilled in 1992 represent at least a 30-year low in the Sacramento Valley drilling record.

Montis Niger drilled 35 holes (27% of the total) and completed 16 (28% of the total) of them as gas wells, for a fine 46% record. A very conspicuous margin separates Montis Niger's numbers from those compiled by Capitol Oil (12 drilled; 6 completions) and Nahama & Weagant (12 drilled; 7 completions). These latter companies, however, have been the mainstays of the valley industry for years.

Another conspicuous margin separates the above Independents from the other 33 Operators who entered the local drilling arena in 1993. ABA Energy caused 6 holes to be drilled and realized 3 completions. Other reasonably active companies were: Chevron (4 drilled/3 completions); North Valley Oil & Gas (4/1); Slawson Exploration (4/2); and E.B. Towne (4/0). Additionally, 9 of the 36 Operators drilled 3 holes each.

The continued generally depressed state of the industry was reflected in a relative shyness of the drilling dollar. Sixteen (16) of the Operators (or 44%) drilled one hole, only. The ongoing shouldering of the drilling burden by a shrinking number of Operators was again illustrated in 1993. Eight (8) of the Operators (or 22%) accounted for 62% of the holes drilled and 67% of the new gas wells.

Shy as the drilling dollar might be, several Independents showed their mettle by stepping out and drilling relatively high-risk prospects with the very encouraging result that as many as **9 New Gas Fields** may have been discovered. This represents a significant increase over the 2 new field discoveries in 1992. The possible new field discovery wells are listed in Figure 1. It is worth noting that Montis Niger is being credited with 3 of the discoveries, and Nahama & Weagant, 2 of them.

As indicated in Figure 1, much of the drilling activity was focused in the central valley due, in large part, to Montis Niger's efforts (and large lease holdings) in that region. Yolo and Solano Counties are the perennial favorites, the industry having drilled 41% of the holes in just these two counties. Add Sutter County and the percentage rises to 57%. Sutter County showed a strong improvement in activity over the 1992 record — 21 versus 2 holes. Colusa County witnessed a drop in activity from the previous two years; however; the 90% completion rate in 1993 (10 holes drilled; 9 completions) testifies to the potential in that region.

In some respects, 1993, can be viewed as a landmark year relative to well-head pricing in the Sacramento Valley. Commencing May 1, 1993, PG&E converted from its traditional year-to-year fixed pricing pattern to one based on spot-market indexing. From that date forward, PG&E's prices, which serve as a datum for much of the industry, will change each month as exampled by the post-May 1 record: (April - $1.52); May - $2.09; June - $1.53; July - $1.56; August - $1.76; September - $1.92; October - $1.65; November - $1.64; and December - $2.44 (Average - $1.84). The price in January, 1994 was $2.09. Time will tell if this new policy will impact drilling activity. As the chart in Figure 7 clearly shows, there is a strong and direct correlation between well-head prices and drilling activity.

Purchasers such as Dow Chemical and Tosco continue to buy gas directly from producers, and on very favorable terms. Many producers have been forced to sell their gas to end users via brokers. As in the case of Dow and Tosco, these other outlets can offer a premium over PG&E's base-price.

It is too early to gauge the impact that the new pipelines into the state (central and southern California) will have on the local gas economy. Most producer concerns are geared more toward the probable negative affects of PG&E's twinning of its Canadian line and, as well, the arrival into the valley of the Mojave line from the central part of the state. Gas from both of these lines is programmed to fuel the 4 cogeneration plants that SMUD plans to build in the Sacramento area.

The expectations for 1994 are that well-head prices will remain more or less firm and very likely, could improve across the year. Also, Montis Niger should continue its intense search for gas.

Figure 1

1993

ACTIVITY BY COUNTY

| | Holes Drilled | Gas Wells | Percentage Success | Previous 2 Years Holes (Gas Wells) 1992 | 1991 |
|---|---|---|---|---|---|
| Yolo | 28 | 12 | 43% | 20(9) | 17( 2) |
| Solano | 25 | 11 | 44% | 24(8) | 23(16) |
| Sutter | 21 | 9 | 43% | 2( 2) | 15( 5) |
| Glenn | 16 | 4 | 25% | 11( 2) | 16( 5) |
| Contra Costa | 12 | 5 | 42% | 2( 2) | 5( 2) |
| Colusa | 10 | 9 | 90% | 18(11) | 19(12) |
| Sacramento | 7 | 2 | 29% | 10( 5) | 1( -) |
| San Joaquin | 6 | 3 | 50% | 12( 2) | 10( 2) |
| Tehama | 4 | 2 | 50% | 3( 2) | 4( 3) |
| Stanislaus | 1 | - | - | 1( 1) | -( -) |

POSSIBLE NEW GAS FIELD DISCOVERIES

| | | Sec.-T-R | County |
|---|---|---|---|
| Amerada Hess | Dohrmann 1 | 6- 1N-5E | San Joaquin |
| Enron | Nixon 22-1 | 22- 5N-3E | Solano |
| Montis Niger | Petsec 4-31 | 31-13N-1E | Colusa |
| Montis Niger | Transamerica 4-36 | 36-12N-2E | Sutter |
| Montis Niger | Tucker 1-31X | 31-13N-2E | Sutter |
| Nahama & Weagant | Mirror 16-58X | 16- 1N-3E | Contra Costa |
| Nahama & Weagant | Tracy 13-25 | 13- 2S-4E | San Joaquin |
| North Valley | Cecchini 1-32 | 32- 2N-3E | Contra Costa |
| XTX | Transamerica 34-1 | 34-17N-1W | Colusa |

Figure 2

1993

RANGES IN TOTAL DEPTHS*

| | 1993 | 1992 | 1991 | 1993 | 1992 | 1991 |
|---|---|---|---|---|---|---|
| Less than 2999 feet | 6 | 3 | 3 | 5% | 3% | 3% |
| 3000 - 3999 " | 15 | 12 | 13 | 12% | 12% | 12% |
| 4000 - 4999 " | 30 | 11 | 10 | 23% | 11% | 9% |
| 5000 - 5999 " | 12 | 7 | 14 | 9% | 7% | 13% |
| 6000 - 6999 " | 16 | 11 | 18 | 12% | 11% | 17% |
| 7000 - 7999 " | 11 | 14 | 16 | 8% | 14% | 15% |
| 8000 - 8999 " | 22 | 23 | 17 | 17% | 23% | 16% |
| 9000 - 9999 " | 12 | 13 | 13 | 9% | 13% | 12% |
| 10,000 - 10,999 " | 5 | 1 | 3 | 4% | 1% | 3% |
| 11,000 - 11,999 " | 2 | 2 | - | 2% | 2% | - |
| 12,000 - Plus " | - | 1 | - | - | 1% | - |

Deepest Hole Drilled: Confidential hole. Total depth reportedly between 11,000 and 12,000 feet.

AVERAGE TOTAL DEPTHS*

| 1993 | 1992 | 1991 | 1990 | 1989 |
|---|---|---|---|---|
| 6388 ft. | 6918 ft. | 6320 ft. | 6840 ft. | 6563 ft. |

NUMBER OF HOLES BY DRILLING CONTRACTORS

| | 1993 | 1992 | 1991 |
|---|---|---|---|
| Hexadyne Drilling | 48 (37%) | 51 (54%) | 42 (37%) |
| Paul Graham | 47 (36%) | 30 (32%) | 28 (24%) |
| Gary Drilling | 14 (11%) | 8 ( 8%) | 7 ( 6%) |
| Blue Sky (Formerly H. L. Camp) | 10 ( 8%) | 4 ( 4%) | 34 (22%) |
| Veco | 7 ( 5%) | 1 ( 1%) | - |

* Approximate due to Confidential Status and incomplete industry reporting.

Figure 3

SACRAMENTO VALLEY DRILLING ACTIVITY HIGHLIGHTS 1993

| | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|
| Number of holes drilled | 130 | 95 | 115 | 156 |
| Redrills | 19 | 12 | 7 | 12 |
| Total holes drilled | 149 | 107 | 122 | 168 |
| Holes completed as gas wells | 57 | 45 | 48 | 69 |
| Success percentage - all holes | 38% | 42% | 39% | 41% |
| Success percentage - original holes | 44% | 47% | 42% | 44% |
| Number of Operators | 36 | 30 | 38 | 47 |
| Operators finding gas | 18(50%) | 17(57%) | 21(55%) | 24(51%) |
| Operators drilling 1 hole | 16(44%) | 12(40%) | 13(34%) | 20(43%) |
| Operators drilling 2 holes | 3( 8%) | 7(23%) | 11(29%) | 13(28%) |

The eight (8) Operators (or 22%) that drilled 4 or more holes effected 62% of the drilling.

The same eight (8) completed 67% of the gas wells.

MOST ACTIVE OPERATORS

| | Number of Holes Drilled | Gas Wells | 1992 Drilled / Wells |
|---|---|---|---|
| Montis Niger, Inc. | 35 | 16 | 0 |
| Capitol Oil Corp. | 12 | 6 | 12 / 5 |
| Nahama & Weagant Energy | 12 | 7 | 11 / 7 |
| ABA Energy Corp. | 6 | 3 | 4 / 3 |
| Chevron | 4 | 3 | 8 / 7 |
| North Valley Oil & Gas | 4 | 1 | 2 / 2 |
| Slawson Exploration | 4 | 2 | 0 |
| E. B. Towne | 4 | - | 2 / 0 |

Nine (9) Operators drilled 3 holes each.

Compiled by R. J. Bain (Sources: Munger Oilogram and Div. of Oil & Gas)

Figure 4

SUMMARY OF DRILLING ACTIVITY IN THE SACRAMENTO VALLEY

| | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 |
|---|---|---|---|---|---|---|---|---|---|
| Number of holes drilled | 154 | 178 | 192 | 191 | 122 | 126 | 141 | 155 | 180 |
| Number of Redrills | 3 | 27 | 12 | 23 | 10 | 11 | 25 | 20 | 30 |
| Total number of holes | 157 | 205 | 204 | 214 | 132 | 137 | 166 | 175 | 210 |
| Holes completed as Gas Wells | 48 | 65 | 65 | 62 | 38 | 41 | 51 | 60 | 75 |
| Success Percentage | 31% | 32% | 32% | 29% | 29% | 30% | 31% | 34% | 36% |
| Number of Operators | 59 | 59 | 59 | 57 | 42 | 47 | 48 | 47 | 41 |
| Number drilled below 10,000 ft. | | | | | 5 | 7 | 15 | 12 | 3 |
| Deepest hole (000 Feet) | | | | | 11.3 | 16.4 | 15.2 | 18.3 | 11.4 |
| Number of Gas Wells*** | 1089 | 1122 | 1148 | 1174 | 1204 | 1218 | 1218 | 1257 | 1320 |
| Total gas produced - D.O.G. District 6 (Million MCF) | 255 | 215 | 251 | 234 | 256 | 264 | 267 | 258 | 167 |
| Remaining Reserves - D.O.G. District 6 (Million MCF) | 2793 | 2656 | 2938 | 2676 | 2498 | 2622 | 2371 | 2426 | 2358 |
| Well-head Price (PG&E Ave.) | | | | 30¢ | 30¢ | 33¢ | 35¢ | 39¢ | 44¢ |

* Valley depth record.
** Highest price = $3.85 - Dec. 1984
*** Includes shut-in wells (D.O.G.)

Compiled by R. J. Bain for the Sacramento Petroleum Association.

Figure 5

SUMMARY OF DRILLING ACTIVITY IN THE SACRAMENTO VALLEY (Continued)

| | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|---|---|---|---|
| Number of holes drilled | 164 | 153 | 155 | 163 | 156 | 228 | 238 | 214 | 234 |
| Number of Redrills | 43 | 19 | 15 | 18 | 11 | 32 | 35 | 26 | 29 |
| Total number of holes | 207 | 172 | 170 | 181 | 167 | 260 | 273 | 240 | 263 |
| Holes completed as Gas Wells | 49 | 60 | 74 | 51 | 41 | 83 | 96 | 82 | 97 |
| Success Percentage | 24% | 34% | 43% | 31% | 25% | 31% | 35% | 38% | 37% |
| Number of Operators | 44 | 44 | 56 | 56 | 53 | 63 | 56 | 68 | 58 |
| Number drilled below 10,000 Ft. | 8 | 13 | 4 | 5 | 19 | 24 | 20 | 23 | 21 |
| Deepest hole (000 Feet) | 12.4 | 11.1 | 12.0 | 11.8 | 12.9 | 19.7* | 12.8 | 14.1 | 13.2 |
| Number of Gas Wells*** | 1344 | 1282 | 1434 | 1305 | 1315 | 1328 | 1420 | 1493 | 1542 |
| Total gas produced - D.O.G. District 6 (Million MCF) | 162 | 142 | 163 | 142 | 168 | 146 | 184 | 151 | 175 |
| Remaining Reserves - D.O.G. District 6 (Million Mcf) | 2358 | 2034 | 1630 | 1467 | 1397 | 1289 | 1194 | 1140 | 1078 |
| Well-head Price (PG&E Ave.) | 60¢ | 98¢ | $1.20 | $1.45 | $1.74 | $2.04 | $2.60 | $3.14 | $3.43 |

* Valley depth record
** Highest Price = $3.85 - Dec. 1984
*** Includes shut-in wells (D.O.G.)

Figure 6

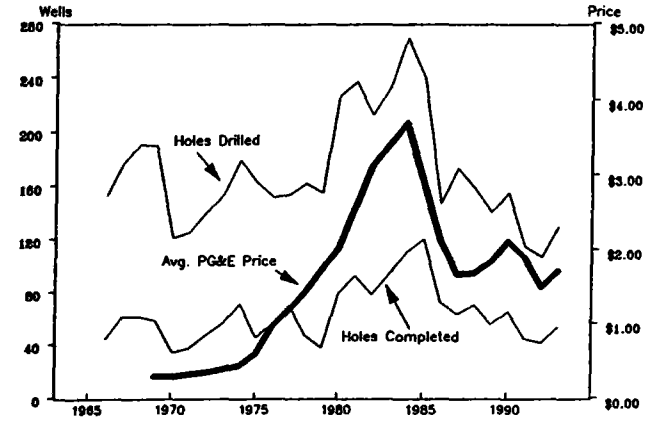
SUMMARY OF DRILLING ACTIVITY IN THE SACRAMENTO VALLEY (Continued)

| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of holes | 270 | 241 | 148 | 174 | 159 | 141 | 156 | 115 | 95 | 130 |
| Number of Redrills | 20 | 21 | 12 | 16 | 13 | 10 | 12 | 7 | 12 | 19 |
| Total number of holes | 290 | 262 | 160 | 190 | 172 | 151 | 168 | 122 | 107 | 149 |
| Holes completed as Gas Wells | 114 | 124 | 76 | 67 | 74 | 59 | 69 | 48 | 45 | 57 |
| Success Percentage | 39% | 46% | 48% | 35% | 43% | 39% | 41% | 39% | 42% | 38% |
| Number of Operators | 65 | 72 | 46 | 56 | 41 | 51 | 47 | 38 | 30 | 36 |
| Number drilled below 10,000 Ft. | 15 | 12 | 8 | 14 | 11 | 2 | 3 | 1 | 4 | 7 |
| Deepest hole (000 Feet) | 11.8 | 12.2 | 16.8 | 12.2 | 10.9 | 10.3 | 11.4 | 10.3 | 12* | 11* |
| Number of Gas Wells*** | 1611 | 1665 | 1685 | 1669 | 1670 | 1628 | 1639 | 1604 | 1146 | |
| Total gas produced - D.O.G. District 6 (Million MCF) | 207 | 199 | 191 | 155 | 143 | 122 | 119 | 139 | 121 | 110E |
| Remaining Reserves - D.O.G. District 6 (Million MCF) | 964 | 935 | 879 | 856 | 726 | 620 | 583 | 585 | 531 | |
| Well-head Price (PG&E Ave.) | $3.72** | $2.94 | $2.14 | $1.69 | $1.70 | $1.85 | $2.13 | $1.90 | $1.52 | $1.73 |

* Valley depth record
** Highest price = $3.85 - Dec. 1984
*** Includes shut-in wells (D.O.G.

Figure 7

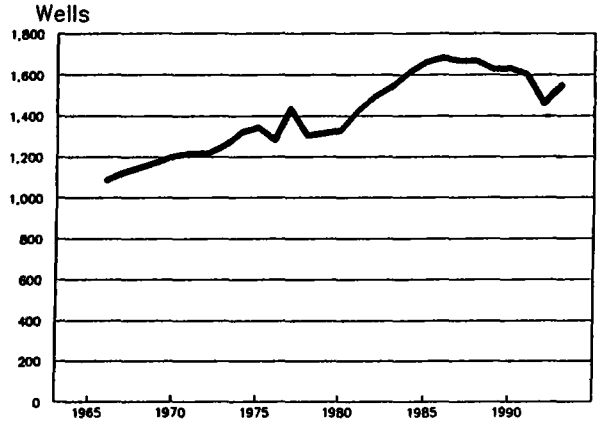
## IMPACT OF PRICE ON DRILLING
Sacramento Valley Activity




Source: PG&E and R.J. Bain

Figure 8

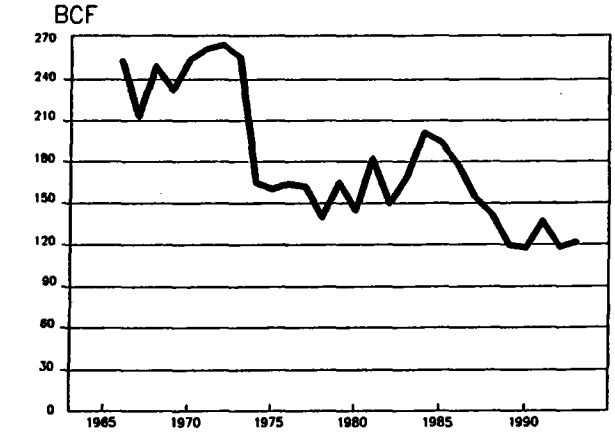
## NUMBER OF GAS WELLS




Source: California Division of Oil and Gas

Figure 9

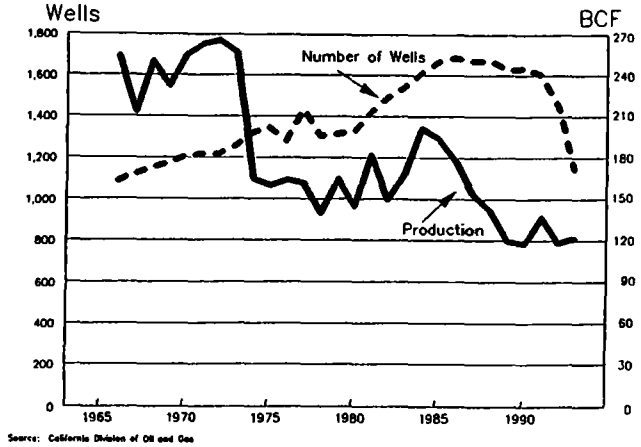
## ANNUAL GAS PRODUCTION




Source: California Division of Oil and Gas

Figure 10

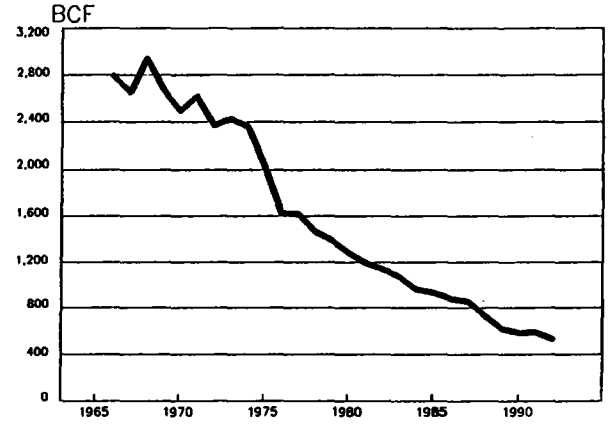
## NUMBER OF GAS WELLS AND ANNUAL GAS PRODUCTION




Source: California Division of Oil and Gas

Figure 11

## REMAINING RESERVES




Source: California Division of Oil and Gas

# NORTH BELRIDGE COMES INTO ITS OWN

After years of hiding in the shadow of the larger South Belridge field, the North Belridge field 40 miles northwest of Bakersfield is about to have its day in the sun. The Kern County oil field is joining the ranks of the nation's giant fields.

The club is a relatively exclusive one. Since the first oil production began in Kern County in the late 1800's, only 16 of the 87 fields that have been discovered in the county have produced 100 million or more barrels of oil.

In oil field parlance, that makes them giant fields. There are 262 such fields in the United States, with the largest numbers in Texas, 90; Louisiana, 55; and California, 44, including in addition to the Kern fields 4 other San Joaquin Valley fields, 10 Coastal area fields and 14 Los Angeles Basin fields.

Based on the production rate of recent months, North Belridge figures to reach the 100-million-barrels plateau before the end of the second quarter.

Though the field is making a significant achievement, North Belridge through its early years hardly looked like a candidate for major production honors.

During the first 12 years of production after discovery in 1912, North Belridge was less than impressive. In fact, the field's performance qualified it for inclusion in an article titled "The Minor Oil Fields of Kern County" that was published in the July 1924 issue of the State Mining Bureau's Summary of Operations — California Oil Fields.

The article noted that production had been developed from two zones, namely an upper zone at 600-800 feet from which wells produced 3 to 30 barrels per day of 15-gravity oil and a deeper zone within brown shale at about 4,400 feet from which wells produced 15 to 100 barrels per day of 29 to 38 degrees gravity oil.

Gas engines powered the pumping units that produced the heavy crude. The pumping units on the deeper zone wells were powered by electricity.

Along with oil, the deeper zone produced "a considerable volume of gas under low pressure." A nearby plant utilized the gas in the production of gasoline.

An independent name Mannell-Minor Petroleum Co. discovered the North Belridge field, completing the 3,025 foot discovery well on Sec. 35, 27S-20E, in fractured shale. The first recorded production was 18 barrels per day of 30.8-gravity oil. The field initially was called the Mannell-Minor field.

In June 1932, Belridge Oil Co. proved up production in the Belridge 64 sand, completing the deeper pool discovery well on Sec. 27, 27S-20E, from a depth of 8,062 feet flowing 80 to 100 million cubic feet per day of gas and 2,092 barrels per day of 50.2 gravity condensate.

The sand subsequently proved to be the field's most productive pay, accounting for almost one out of every two barrels of oil and condensate and nearly two-thirds of the gas produced by the field to the end of last year.

In the fourth quarter of last year, production from the North Belridge field averaged 6,150 barrels per day from some 440 active wells. Another 360 wells were shut in. The field's largest producer was Shell, accounting for some 5,000 barrels per day.

Thanks to steam injection, fracturing and waterflooding, most of the field's production now comes from shallow pays. The Tulare zone at an average depth of 600 feet produces about 2,000 barrels per day. The Diatomites at an average depth of 2,200 feet produces approximately 3,800 barrels daily. Production had been reported from the Diatomite as early as 1912, but the zone did not come into its own until the late 1970's when fracturing began to turn the key in the lock.

When the North Belridge field reaches the 100-million-barrel mark, it will still have some 30.4 million barrels of recoverable oil left, according to estimates by the Division of Oil, Gas and Geothermal Resources. Along with oil and condensate, the field during its 82-year life has produced 646.4 billion cubic feet of gas. Gas reserves are estimated at 76.9 billion cubic feet.

*— Bill Rintoul*
*Historical Editor*

## NOTICE OF CHANGE TO TEXT AS ORIGINALLY PROPOSED HYDROGEOLOGY REGULATION: 15–DAY CHANGE

**NOTICE IS HEREBY GIVEN** that the Board of Registration for Geologists and Geophysicists has proposed a modification to the text of section 3042, subsection (c) in Title 16 of the California Code of Regulations which was the subject of a regulatory hearing on March 24, 1993. A copy of the modified text is follows.

In the following text showing 15–day modifications, deletions from the text as originally proposed has been lined out (e.g., ~~deletion~~); additions to the text as originally proposed are double underlined (e.g., addition).

Submit comments to:

Denise Pellerin, Regulation Coordinator
Board of Registration for Geologists and Geophysicists
400 R Street, Suite 4060
Sacramento, CA 95814

REASON FOR THE 15–DAY CHANGES

In accordance with the CCR, 15–day changes generally clarify the meaning of a section, make stylistic changes such as renumbering, and/or respond to comments made during the public hearing process which are permissible by law and enhance the originally proposed regulations.

Under the proposed regulations it is unclear which Geologists may provide the references required by subsection (c) of Section 3042. The proposed regulations require references from certified hydrogeologists or registered geologists who are "qualified to practice hydrogeology". The Board's intent is to require references from registered geologists who have the experience required to apply for specialty certification pursuant to Business and Professions Code section 7842. Consequently, the Board's intention is to require references from certified hydrogeologists or registered geologists who have 5 years experience in responsible charge of hydrogeological work.

The Board of Registration for Geologists and Geophysicists amends section 3003 and adopts section 3042 of Division 29 of Title 16, California Code of Regulations as follows:

1. Amend section 3003, Title 16, California Code of Regulations to add subsection (h):

(h) "Hydrogeology" means the application of the science of geology to the study of the occurrence, distribution, quantity and movement of water below the surface of the earth, as it relates to the interrelationships of geologic materials and processes with water, with particular emphasis given to groundwater quality.

NOTE; Authority cited: Section 7818, Business and Professions Code. Reference: Sections 7800, 7802, 7804, 7822, 7841, and 7841.1 Business and Professions Code.

2. Adopt Section 3042, Title 16, California Code of Regulations as follows:

3042. Specialty in Hydrogeology.

(a) A specialty in "hydrogeology" is hereby created as a division of the certification for registration as a geologist. The creation of the certification in hydrogeology is established to protect the health, safety and welfare of the people of the State of California.

(b) In addition to the provisions of section 7842 of the Code, an applicant for certification in the specialty of "hydrogeology" shall comply with the following:

(1) Be registered as a geologist in the State of California.

(2) Have a knowledge of and experience in:

(A) Geology of the State of California

(B) Geologic factors relating to the water resources of this State.

(C) Principles of groundwater hydraulics and ground water quality including the vadose zone.

(D) Applicable federal, state and local rules and regulations.

(E) Principles of water well, monitoring well, disposal well, and injection well construction.

(F) Elementary soil and rock mechanics in relation to groundwater, including the description of rock and soil samples from wells.

(G) Interpretation of borehole logs as they relate to porosity, permeability or fluid character.

(c) An applicant for certification as a hydrogeologist shall submit, with his or her application, three (3) references from either registered hydrogeologists or registered geologists who ~~are qualified to practice hydrogeology~~ *have a minimum of five years experience in responsible charge of hydrogeological work.* An applicant may also be required to submit one or more hydrogeology reports which were prepared by him or her or which he or she was closely associated with during its preparation.

(d) A civil engineer registered to practice civil engineering in this state, under Chapter 7 (commencing with Section 6700) of Division 3 of the Business and Professions Code, insofar as he or she practices civil engineering is exempt from the provisions for certification as a hydrogeologist.

NOTE: Authority cited: Sections 7818 and 7822, Business and Professions Code. Reference: Sections 7804, 7822, 7841 and 7842, Business and Professions Code.

# TITLE 16, DIVISION 29 BOARD OF REGISTRATION FOR GEOLOGISTS AND GEOPHYSICISTS

## NOTICE OF PROPOSED RULEMAKING

**NOTICE IS HEREBY GIVEN** that the Board of Registration for Geologists and Geophysicists (Board) is proposing to take the action described in the Informative Digest. Any person interested may present statements or arguments orally or in writing relevant to the action proposed. A hearing on the proposal will be held before the Board's Professional Affairs Committee at the Department of Consumer Affairs Hearing Room, Suite 1030, 400 R Street, Sacramento, CA 95814 at 9:30 A.M. on Thursday, May 19, 1994. Written comments must be received by the Office of the Board not later than 5:00 P.M. on Monday, May 16, 1994. The Board, upon its own motion or at the instance of any interested party, may thereafter adopt the proposal substantially as described below or may modify such proposal if such modifications are sufficiently related to the original text. With the exception of technical or grammatical changes, the full text of any modified proposal will be available for 15 days prior to its adoption at the office of the Board from the person designed in this Notice as contact person. The Board requests that anyone who intends to offer testimony at the hearing also provide their comments in writing.

Authority and Reference: Pursuant to the authority vested by Section 125.9, 148, 149 and 7818, of the Business and Professional Code, and to implement, interpret or make specific Sections 125.9, 148 and 149, of said Code, the Board is considering changes to Division 29 of Title 16 of the California Code of Regulations as follows:

## INFORMATIVE DIGEST

**1. Adopt Sections 3062, 3062.1, 3062.2, 3062.3, 3062.4**

Existing law authorizes the Board to issue citations and fines to unregistered and unlicensed individuals who violate the Geologist and Geophysicist Act (Business and Professions Code sections 7800, et seq.). This proposal would provide for procedures to implement a citation and fine system against unregistered/unlicensed individuals who violate the Geologist and Geophysicist Act.

**2. Adopt Sections 3063, 3063.1, 3063.2, 3063.3, 3063.4**

Existing law authorizes the Board to issue citations and fines to registrants and licensees who violate the Geologist and Geophysicist Act (Business and Professions Code sections 7800, et seq.). This proposal would provide for procedures to implement a citation and fine system against registered/licensed individuals who violate the Geologist and Geophysicist Act.

## FISCAL IMPACT ESTIMATES

**Fiscal Impact on Public Agencies Including Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State:** *Insignificant*

**Nondiscretionary Costs/Savings to Local Agencies:** *None*

**Local Mandate:** *None*

**Costs to any Local Agency or School district for Which Government Code Section 17561 Requires Reimbursement:** *None*

**Business Impact:** *The Board has determined that the proposed regulatory action would have no significant adverse economic impact of California business enterprises and individuals, including the ability of California businesses to compete with businesses in other states.*

**Cost Impact on Private Persons or Entities:** *Insignificant*

**Housing Costs:** *None*

## CONSIDERATION OF ALTERNATIVES

The Board must determine that no alternative which it considers would either be more effective than or as effective as and less burdensome on affected private persons that the proposal described in this Notice.

Any interested person may present statements or arguments orally or in writing relevant to the above determinations at the above mentioned hearing.

## ASSESSMENT OF JOB/BUSINESS CREATION OR ELIMINATION

The Board has made an assessment that the proposed regulatory action would not (1) create or eliminate jobs within California, (2) create new business or eliminate existing businesses within California, and (3) affect the expansion of businesses currently doing business within California.

Any interested person may present statements or arguments orally or in writing relevant to the above determinations at the above-mentioned hearing.

## STATEMENT OF REASONS AND INFORMATION

The Board has prepared a statement of the reasons for the proposed action and has available all the information upon which the proposal is based.

## TEXT OF PROPOSAL

Copies of the exact language of the proposed regulation and of the statement of reasons and other information, if any, may be obtained at the hearing or prior to the hearing upon request from the Board of Registration for Geologists and Geophysicists, Suite 4060, 400 R Street, Sacramento, CA 95814-6200.

## CONTACT PERSON

Inquires concerning the proposed action may be directed to Denise Pellerin, Office Manger, at the above address or at (916) 445-1920.

**WANTED: BAKERSFIELD-AREA FEMALE GEOSCIENTISTS** who have yard work, painting, etc. to do...high school girls want to help!

These girls are participating in the Girl Scouts' GEMS ("Girls Enjoying Math and Science") program, and are considering careers in Geology. They would love to work on a home improvement project with you, talk with you and earn some money. (I plan to pay $6/hour and provide a ride).

If you're interested, please send name, address, phone number, etc. to me at 304 No. Stine Rd., Bakersfield, CA 93309. Or call me at (805) 631-0278 (h) or (805) 763-6183 (w). Thanks! JoAnn Conard

## *Delegate's Corner*

Recently, I had the opportunity to attend the annual "AAPG Day in Tulsa" along with other AAPG members active at the National, Sectional, and local society levels. I strongly recommend anyone who has the opportunity to attend in the future to do so. The purpose of the meeting is to allow everyone to meet and become acquainted with each other and with the various programs and activities run by the National organization. The meeting consisted of three parts; an informal cocktail party Saturday evening, providing an opportunity to meet each other, a semi-formal series of "State of the Society" presentations (National, sectional, and local) that took up most of Sunday, and a half day tour of the National Headquarters Building on Monday. Each of these events was equally important and allowed me to get a feeling for the problems facing other societies, some of the innovative ideas with which they are experimenting, and some ways in which the National Society is aiding the local and sectional societies.

As a result of the trip to Tulsa, we are in negotiations with National to have Frank Wantland and Mary Sue Hayward offer their well-received one-day seminar on "Career Options" in Bakersfield at a subsidized rate. We're aiming for a weekend class in late summer. In addition several courses/seminars offered at other societies looked interesting and with a little effort we may be able to offer similar courses in the near future. Copyrighted articles from National AAPG publications may be made available to sectional and local societies for special reprint volumes. To assist in membership drives, National AAPG is providing a free book with each student membership, has a special membership rate for active members returning to the university for advanced degrees, and has dropped reinstatement fees for returning members. The National DPA, which was unaware of the magnitude of the Alaska Oil Export controversy on the west coast, is now actively engaged and recommending support of HR-543.

Overall, it was a real eye-opener to go to Tulsa and meet with all the dedicated people working on AAPG activities. I came away with the feeling they are eager to help us in any way they can and that PacSec should try to work closer with National and the other sectional societies. It's truly amazing the breadth of activities in which the various societies are involved; some of which have been discussed in articles in the Explorer or Bulletin but also many that are not widely known. It would take too much space to itemize and discuss them all here, so catch me at a SJGS meeting or at the convention and I'll fill you in. Or better yet, get involved with your local society and attend the AAPG Day for yourself.

*Regards, Bob Countryman*
*SJGS Delegate Chair*

## FIRST DIBBLEE MEDAL RECIPIENT NAMED

At its Annual Meeting in Santa Barbara, April 9, 1994, the Board of Directors of the Thomas Wilson Dibblee Jr., Geological Foundation selected Dr. Lehi F. Hintze, Professor Emeritus of Geology at Brigham Young University, as the first recipient of the Dibblee Medal.

The purpose of the Dibblee Medal is to honor the extraordinary geologic mapping achievements of Tom Dibblee and to underline the importance of geologic field mapping as a means of providing solutions to complex geological problems. Dibblee's maps have been used by thousands of geologists, and are indispensable to the earth sciences.

Dr. Hintze has spent a lifetime in geologic mapping. He is the author or co-author of over 50 geologic maps. Of these maps, he is the single author of 34 published geologic quadrangle maps, published between 1960 and 1993. He was the single compiler of the 1980 edition of the Geologic Map of Utah. He is currently a senior geologic mapper for the Utah Geological Survey.

The Thomas Wilson Dibblee Jr. Geological Foundation is a non-profit corporation, chartered in California to print and publish Tom Dibblee's more than 600 seven-and-one-half minute geologic quadrangle maps. Tom Dibblee, 82, lives in Santa Barbara.

**New Publication Available**

"FIELD GUIDE TO THE MONTEREY FORMATION BETWEEN SANTA BARBARA AND GAVIOTA, CALIFORNIA"
Edited by
J. Scott Hornafius
Mobil Oil, Bakersfield, CA

This field guide was used for an extremely informative one-day field trip led by Scott Hornafius in conjunction with Pacific Section convention in Ventura. Several of the papers in the field guide were presented at the meeting. Anyone interested in the Monterey formation or simply curious about the rocks that make up the cliffs along this beautiful stretch of the coast will want to acquire this publication.

Make checks payable to: Publications Pacific Section AAPG in the amount of $17.50 (includes shipping and handling). Mail to: Publications, Pacific Section AAPG, P.O. Box 1072, Bakersfield, CA 93302.

# HALBOUTY GIVES IDEAS ON REVIVING DOMESTIC EXPLORATION, CREATING THOUSANDS OF JOBS

HOUSTON — In a speech to the Permian Basin Oil & Gas Recovery Conference in Midland, Texas, Michel T. Halbouty, internationally renowned geoscientist and petroleum engineer, stated that although the government is very blasé and unconcerned about the petroleum industry's on-going existence, the government could help itself, the industry and all American by approving a simple tax incentive that would restore exploration and production; revitalize the domestic petroleum industry; and enhance hundreds of satellite entities that are dependent on the exploration segment of the industry.

"It is," Halbouty said, "a very simple incentive in which no federal taxes would be paid on production for the entire productive life of a field discovery well, irrespective of whether it is oil or gas. It would initiate a resurgence of money into exploration from investors, not only from the U.S., but from all over the world." He also predicted, "the rig count would soar, the increased oil production would correspondingly reduce the imports; and the increased gas production would enhance our domestic energy requirements. Without a doubt, it would revive exploration, create thousands of jobs, improve the economy in many ways, thus benefiting the nation's people — AND it would encourage the majors to resume exploration in the U.S. Although the "field discovery well" would be tax exempt for its entire productive life, it would cause many taxable development wells to be drilled as a result of the new discovery and would be a catalyst for investors to participate in new wildcat ventures. The exploration boom that the incentive would generate would put more money in the Treasury than it is now receiving from the depressed oil patch."

Halbouty also stated, "This incentive is so simple, so constructive and so rewarding that it behooves both the Congress and The White House to assess its merits and act immediately. If Washington is ever interested in the preservation and restoration of our up-stream petroleum industry this would be a formidable positive step."

He defined a "field discovery well" as "new production from an exploratory wildcat well in an area where no other production exists within the confines of a geologic prospect on which the discovery was made. It does not include a new reservoir discovery in an existing field; it does not include an extension of an existing field; and it does not include new production in deeper zones in an existing field. This incentive would **only apply to a rank wildcat discovery**," he said.

Halbouty concluded his remarks by stating this one tax incentive "would go a long way in turning the industry around as it would ignite the pioneer spirit of the wildcatters to take the lead in the reindustrialization of America."

## NORTHRIDGE 6.7 Mo EARTHQUAKE SLIDE SET

The Department of Geological Sciences at California State University, Northridge (Cal State Epicenter) and the Coast Geological Society are offering a teaching set of 40 slides and annotated guide on the January 17, 1994 Northridge Earthquake. Diagrams and photographs include:

- diagrams by E. Hauksson showing regional setting,main and aftershock locations, and cross section
- aerial photographs by K. Sieh
- ground deformation
- damage to house and other structures
- damage to freeways
- damage to CSU Northridge

This is a non-profit project benefiting the Geology Scholarship Fund. Send donations of $25.00 payable to "Geology Trust Fund" to:

**Peter W. Weigand**
**Dept. of Geological Sciences**
**California State University**
**Northridge, CA 91330-8266**

*Please indicate if you want a receipt.*

## *Recommended Reading...*

AAPG BULLETIN

Vol. 78, No. 4 (April, 1994)
Geology and Geothermal Origin of Grant Canyon and Bacon Flat Oil Fields, Ralroad Valley, Nevada, J.B. Hulen, et. al.

GEOLOGICAL SOCIETY OF AMERICA BULLETIN

Vol. 105, No. 11 (Nov. 1993)
Late Cenozoic Tectonic Evolution of the Los angeles Basin and Inner California Borderland: A Model for Core Complex-Like Crustal Extension, J.A. Crouch et. al., P. 1415.

GEOLOGY

Vol. 22, No. 3 (March. 1994)
Coastal Uplift Associated the Cape Mendocino Earthquake, Northern California, G.A. Carver, et. al., P. 195.

No. 4 (April 1994)
Wilshire Fault: Earthquakes in Hollywood?, C. Hummon et. al., P. 291.

Outside Publication 46. Age Determinations for Eocene Formations of the San Diego California, Area, Based on Pollen Data, by N.O. Frederiksen, in Field Trip Guidebook - Pacific Section, SEPM, in Eocene Geological History, San Diego Region. (Abbott et al). 68. 1991. p. 195-200

Outside Publication 163. Sources of Chloride in Groundwater of the Oxnard Plain, California in (abstr.) American Water Resources TPS, in Symposium of Water Supply and Water Reuse: 1991 and Beyond: Proceedings. (H.E. Bailey, editor and others). 91-2, 1991. P. 453

## *FIELD TRIPS*

Sponsored by
Bureau of Land Management

The Bureau of Land Management has initiated a program of monthly earth science field trips to points of ecologic, geologic, paleontologic and historic interest throughout central California. These trips are designed for persons of high school age or older. It is **not** necessary to have a technical background to attend or benefit from the trips.

These field trips are recommended for teachers and many of them can be taken for in-service continuing education credit through California State University Bakersfield. Each trip includes a full spectrum of environmental and land management topics.

The field trips are conducted using buses or vans. Private vehicles are not used except in special circumstances. A field guide is prepared for each trip which includes maps and directions which can be used by anyone for self-guided investigation of the ecology along the field trip route.

To register for trips, call Dr. Gregg Wilkerson at (805) 399-6264.

### 1994 SCHEDULE

**Bakersfield to Carpenteria –**
Sat., 6/4/94

**Bakersfield to Point Sal–**
Sat., 7/9/94

**Bakersfield to Ojai and Santa Paula–**
Sat., 8/6/94

DEADLINE FOR SUMMER ISSUE AUGUST 1, 1994



**NEWSLETTER**
**Pacific Section A.A.P.G.**
**Post Office Box 1072**
**Bakersfield, CA 93302**

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Robert L. Countryman
FA-DG-AM Chevron USA
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# PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

*of the Pacific Section*

*American Association of Petroleum Geologists*

**SUMMER 1994 No. 3**


## PRESIDENT'S MESSAGE

This is going to be a good year. Thanks to the efforts of the outgoing Executive Board and the successes of the Ventura and Long Beach Conventions, the PS-AAPG has overcome much of the financial squeeze experienced in recent years. We still have a lot of work ahead of us, and the continued decline in our membership is a worrisome trend, but things have definitely improved. So, as the new Executive Board steps in to take the reins, we'd like to thank the outgoing officers for a job well done. Outgoing President Reinhard Suchsland, V.President Rich Boyd and Secretary Donna Thompson set high standards and we'll have to work hard to measure up. Thanks are also extended to Dalton Lockman and his Ventura crew who put on such a successful convention this year.

The new Executive Board held their first meeting on 19 July with a good mix of both new and familiar people stepping in to handle PS-AAPG's affairs. Congratulations to the newly elected officers: Mark Wilson (Pres-Elect), Larry Knauer (V-Pres), and Laura Bazeley (Secretary). Our talented Treasurer, Donna Miller, of course continues to serve her two year sentence. I'd also like to congratulate PS-AAPG's own Bud Reid for his election as President-elect of National AAPG!

Several changes are noted for the various PS-AAPG Committees: John Randall is our new Advisory Council representative to National AAPG replacing Jack West, Paul Hacker fills the open position on the Legislation and Public Affairs Committee, and Wendy Henderson is appointed as the Membership Secretary to replace long-time stalwart Betty Bean. The other Committee positions remain staffed by last years members with the exception of the Finance Committee where, as of this writing, an open position exists.

Our "Careers Options" seminar, held on 23 July, was attended by 26 people. They gained insights from Frank Wantland and Mary Sue Hayward on current employment trends and how to position themselves to take advantage of them. PS-AAPG was able to offer this seminar for only $15 (including lunch) thanks to generous underwriting and moral support from the National AAPG. Our thanks to Don Tobin for the idea of the seminar and to Bob Millspaugh & staff for their help in organizing it. And of course thanks to Frank and Mary Sue for an excellent seminar. I hope we might be able to offer other short courses or seminars in the future but we need some input on what you would like to see presented. If you have any suggestions of what is needed or you'd like to see, please contact myself at (805) 395-6437 or any of the PS-AAPG officers.

Upcoming events include the 1995 Convention to be held in May in San Francisco (the call for papers are "in the mail") and of course the annual SJGS Bar-B-Que & Golf Tourney in Bakersfield on 9 September. Call SJGS President Terry Thompson at (805) 763-6322 or any of the SJGS officers for details. So, with the price of oil on the way up, lets all get together and celebrate at every opportunity. See you there!

*— Bob Countryman*
*President*

## ❊ CALL FOR PAPERS LAUNCHES 1995 PACIFIC SECTION CONVENTION ❊

The Call for Papers for the 1995 convention of the Pacific Sections of AAPG, SEPM, and SEG, to be held in San Francisco on May 3–5, was mailed in mid-August to all Pacific Section members. The proposed technical program, outlined below, includes 13 symposiums, several general sessions, and poster sessions.

The Call is also being sent to members of our host societies — Northern California Geological Society, Peninsula Geological Society, and the Bay Area Geophysical Society — and other local sponsors, including the Bay area chapters of the Association of Women Geoscientists. If you have not received a copy of the Call for Papers (look for the light blue leaflet) and would like to have one, call Jim Ellis (Asst. Technical Program Coordinator) at (510) 842-3672.

The 1995 convention will be held at the Cathedral Hill Hotel on Van Ness Avenue at Geary Street — a comfortable neighborhood west of the heart of the city and convenient to the California

*(continued on page 2)*

*(continued from page 1)*
Street cable-cars, Japantown, and many good restaurants — and rooms are $95, a bargain for San Francisco. Led by General Chairman Les Magoon, planning for the meeting is well advanced and highlights include:

- Gordon Eaton, recently-appointed Director of the USGS, will be featured speaker for the All-Convention Luncheon.

- a special Electronic Poster Session will highlight innovative technology in Earth Sciences, demonstrating a variety of applications on personal computers.

- entertainment will feature a mystery gala with dinner guests solving a murder in which victim and suspects include earth scientists, environmentalists, and perhaps a stray politician!

Convention theme is **Pan-Pacific: Energy, Economics, Environment, Earth Science**. Technical Program Coordinator Chuck Kluth has developed a program that spans a broad range of applied geosciences with topics from international to local. Planned sessions (with convenor or sponsors) include:

*Regional and International Interest*
- Neogene History of Pacific Rim Basins — *Jim Ingle*
- Pan-Pacific Exploration Frontiers —*AAPG*
- Cenozoic Paleogeography of the Western U. S. — *Gene Fritsche*
- Great Valley Tectonics, Stratigrapy & Petroleum Geology — *Tor Nilsen*

*Industry Concerns*
- The Flow of Energy & Commodities in the Dynamic System of the Pacific Rim — *Don Towse*
- The Future of Energy Gases — *Dave Howell*
- Adding New Growth to Old Fields — *Caroline Isaacs*
- Environmental Applications of Remote Sensing — *Jim Ellis*

*Greater San Francisco Bay Area Interest*
- Miocene through Quaternary Tectonics & Sedimenta tion of the East Bay Area — *Anna Buising*
- Near Surface Geophysical Methods: Bay Area Applications — *Jim Rezowalli*
- Geology & Hydrogeology of the South Bay — *Eugenia Sangines/Dave Andersen*
- Neotectonics of the Greater San Francisco Bay Area — *AEG*
- Groundwater Issues in the Bay Region — *DEG*

*Special Electronic Poster Session*
- Innovative Technology in Earth Sciences — *Rex Sanders* (including visualization, GIS, DBMS, GPS, and potential applications and on-ramps to the Information Super Highway)
- Sedimentary Geology — *SEPM/Tom Anderson*
- Exploration Geophysics & Well Logging — *SEG/SPWLA*

## In Memorium
## SARGENT MERRILL (SARGE) REYNOLDS
## DEC. 9, 1913 — MAY 18, 1994

Born in Alameda, California, Sarge was a 1937 Geology graduate of the University of California Berkley. On January 1, 1937, he and Sarah Elizabeth Thurber of Winters, California were married in Carson City, Nevada. Shortly after leaving college, Sarge began what was to be a life-long career as an exploration geologist, project manager and producing well operator. Sarge was directly involved in the drilling of nearly 200 wells. This activity resulted in over 70 completed wells — 5 of which were New Field Discoveries (the most notable being the Liberty Island Gas field). As one of the pioneers of Sacramento Valley exploration, he was an expert in the region's subsurface geology and was expecially knowledgeable on the Midland Fault System.

Those wishing to honor Sarge's memory may contribute to Yolo County Hospice or the Woodland Opera House Children's Residence Program.

## Editor's Note

As of June 1, 1994, Wendy Henderson assumed the responsibilities of Membership Secretary. During this transition time, we appreciate your patience. All inquiries regarding address changes, membership status, etc. should be directed to her. Thank you.

## *Universities of the Pacific Section — Cal State University, Northridge*

California State University, Northridge (CSUN), more recently referred to as California State University, Epicenter, is alive and thriving. What better place to learn about and experience geology first hand. CSUN is a large, urban university located northwest of Los Angeles in the San Fernando Valley. Although the University suffered substantial damage in the January 17 earthquake, we still have about 26,000 students attending classes either in buildings under repair or in temporary modular classrooms. Naturally, we are experiencing some temporary inconveniences, but these will diminish during the coming school year as most of the major buildings are reopened for use. The Geological Sciences Department has an excellent reputation in the professional community. Our alumni have secured jobs in the geological profession in a wide range of specializations, many have started their own businesses, and many are active in professional organizations both as members and officers.

Professors on the faculty not only enjoy teaching and are rated as good teachers on faculty evaluations done by the students, but also are active in research and in professional organizations. The faculty consists of 10 full-time professors whose specialties cover the gamut of major geological topics, thus allowing our students to obtain a broad, well balanced geological background as well as a wide choice of specializations: Dr. Herbert Adams (UCLA, 1971), engineering geology, computer applications; Dr. George Dunne (Rice, 1972), structural geology, field geology, tectonics; Dr. Peter Fisher (USC, 1972), oceanography, marine geology, remote sensing; Dr. Eugene Fritsche (UCLA, 1969), clastic sedimentology, field geology, paleogeography; Dr. Vicki Pedone (SUNY, Stony Brook, 1991), carbonate sedimentology, diagenesis, environmental geology; Dr. Gerry Simila (UC, Berkley, 1979), geophysics, seismology; Dr. Jon Sloan (UC, Davis, 1980), micropaleontology, oceanography, regional geology; Dr. Richard Squires (Caltech, 1973) macropaleontology, historical geology; Dr. Ali Tabidian (Nebraska, 1987), hydrogeology, environmental geology; Dr. Peter Weigand (North Carolina, 1970), igneous petrology, geochemistry, Department Chair. In addition the Department employs a few part-time faculty and teaching assistants, a full-time technician, and two full-time secretaries.

Students may choose from six different degree programs: B.S. and M.S. degrees in either Geology or Geophysics, B.A. degrees in Earth Science, or a minor in Geology. At present there are about 50 Geology and Geophysics undergraduates, about 30 Earth Science undergraduates, and about 30 Geology and Geophysics graduate students. Most of our courses are field oriented and very practical in their approach. Geology majors take five different field courses before they complete their degree. Appropriate computer applications practice is assigned in many courses. In addition, learning to write geologic reports is emphasized, and two of the field courses require final written reports as well as maps, cross sections, and stratigraphic columns.

Although the Geological Sciences faculty have large teaching loads, they still make time for active research programs. Students become involved in faculty research both as undergraduates, through a required Senior thesis project, and as graduates, when they are doing research for their M.S. degree. Many of our student have been published, either individually or jointly with a faculty member. Over the years, the CSUN Geological Sciences faculty have prepared guidebooks and led field trips five times for the Pacific Section, SEPM, and twice for the Far Western Section, NAGT. In fact, several of us will be leading this Fall's Pacific Section, SEPM field trip on October 1 and 2 to study Eocene rocks in the upper Sespe Creek area (see announcement on page 8). Why not join us and get acquainted? Recent research and publication by the faculty include studies on stratigraphy, paleontology, depositional environments, and paleogeography of southern California Tertiary sedimentary rocks, paleozoic, and Holocene carbonate diagenesis, taxonomy of several newly discovered northeastern Pacific Tertiary fossils, petrology and geochemistry of southern California Tertiary volcanic rocks, structural geology and tectonics of eastern California Paleozoic and Mesozoic igneous and metamorphic rocks, seismic stratigraphy of several offshore southern California basins, groundwater basins, and seismicity related to several southern California earthquakes. Research funding in recent years has come from the AAPG, NSF, Petroleum Research Fund, Conchologists of America and CSUN Foundation.

Research facilities and equipment available to students in the Department include a petrology laboratory containing X-ray fluorescence equipment and two research microscopes with camera attachments; a complete rock preparation and thin section laboratory; a sedimentation laboratory with cathode-luminescence equipment, a research microscope with camera attachments, two ro-tap sieving machines, two Franz isodynamic separators, a stream table and a wave tank; a paleontology laboratory and research museum specializing in Tertiary fossils of California; a darkroom, a drafting room for map preparation; two computer laboratories, one containing three work stations and several PCs and one for Macintoshes (additional computer rooms and facilities are provided by the University); field equipment that includes a Toyota Land Cruiser and self-leveling alidades; hydrogeology equipment consisting of a hand auger, various meters, and USGS MODFLOW software for groundwater modeling; engineering geology equipment including a refraction seismograph, consolidometer, and shear vane device; and geophysics equipment consisting of several seismographs, a proton magnetometer, and resistivity and magnetic susceptibility units.

Also aiding our Department in its teaching and research endeavors is the university library, which contains over a million volumes, more than adequate for the average geology undergraduate. In addition, the University belongs to the Southern California Ocean Studies Consortium, which provides us with use of the R.V. Yellowfin, a completely equipped oceanography research vessel based in San Pedro, and also to the Southern California Desert Studies Consortium, which has a research station near Baker in the Mojave Desert. Finally, our faculty have research contacts and partners at UCLA, UCSB, UCR, Caltech, CSULA, USGS-Menlo Park, and LA County Museum of Natural History, where our students are able on occasion to use library resources and specialized laboratory equipment that we do not have.

For more information write to Peter W. Weigand, Chair, Department of Geological Sciences, California State University, Northridge, CA 91330-8266, or telephone him at (818) 885-3541.

# South Coles Levee Field, San Joaquin Basin, California: An argument against a tilted oil-water contact

by Michael S. Clark
ARCO Western Energy, Bakersfield, CA, 93302

South Coles Levee field, San Joaquin basin, California (Figure 1) has produced more than 58 MMBL of oil and 404 BCF of gas from anticlinal accumulations and stratigraphic pinchouts in the Upper Miocene Stevens sandstone (Dosch, 1962). The F2 zone in the middle and upper Stevens has been represented as a classic example of a reservoir with a tilted oil-water contact (Sheldon and Sutton, 1957; Simonson, 1958). If the reservoir is continuous, lowest known oil positions on the eastern and western sides of the F2 pool indicate an eastward tilt of 175 ft/mi or more for the base of the accumulation (Figure 2). Similar criteria indicate another tilted oil-water contact may be present at North Coles Levee, a separate Stevens accumulation adjacent to South Coles Levee (Davis, 1952; Hardoin, 1962). The key assumption in both examples is that the reservoirs are not internally segmented into separate compartments.

Tilted oil-water contacts are attributed to several mechanisms. Minor tilting may result from capillary pressure variations if pore throat diameters decrease laterally across a reservoir so that water rises above the free-water table higher on the "tight" side of the reservoir than on the "porous" side. Hydrodynamic flow can cause tilting if water movement beneath an oil pool is strong enough to displace the pool towards the flank of a structure. Hydrodynamic tilting may also result from rapid oil production if decreasing pressures during reservoir drawdown allow increased inflow of water on one side of a field. For example, rapid production of oil at Cairo field, Arkansas resulted in a tilt of 100 ft/mi in only 10-12 years (Goebel, 1950).

Another possible tilting mechanism is a lag in the readjustment times of fluid contacts in a tightly-sealed reservoir following regional tilting. However, tectonic tilting is unlikely to be significant since fluid levels should readjust to horizontal in a few thousand years, particularly if only 10-12 years were necessary to disrupt fluid levels at Cairo field (Levorsen, 1967). The significantly longer readjustment time necessary to make tectonic tilting a viable mechanism would require fluid movement driven by capillary and density forces (tectonic model) to be thousands of times slower than fluid movement driven by reservoir drawdown (Cairo field example).

Some tilt of the F2 oil-water contact at South Coles Levee may represent capillary pressure effects resulting from permeability variations across the reservoir (Simonson, 1956). However, lateral transitions from coarse-grained to very fine-grained sandstone result in tilts of only a few feet per mile (Levorsen, 1967). For example, pore throat diameters at South Coles Levee range from >100 μm to <10 μm. If pore throats progressively decrease across the two-mile length of the F2 pool from 100 μm diameters to 10 μm diameters that are blocked 90% by clays (i.e., the effective pore throat diameters are 1 μm), and if a reasonable oil-water interfacial tension of 7 dynes/cm and a 30° water-rock contact angle are assumed, then the oil-water contact at the low-porosity end of the pool would rise 8 ft above the free-water table to give an eastward tilt of only 4 ft/mi (Equation 1).

$$(1)\quad h = (2 * v * \cos\phi) / ((r_w - r_o) * r * g)$$

*h* = height in cm of water rise in a capillary tube
*v* = interfacial tension between oil and water (7 dynes/cm for a 200° F reservoir)
*ø* = contact angle through wetting phase (30°)
$r_w$ = water density (1.03 g/cc for salt water)
$r_o$ = oil density (.85 g/cc for 35° API)
*g* = acceleration of gravity (980 cm/sec$^2$)
*r* = radius in cm of capillary opening

Capillary pressure variations are a viable tilting mechanism only if pore throat sizes progressively decrease laterally within the reservoir. If pore throat size is assumed to be a function of porosity, such a trend cannot be demonstrated at South Coles Levee. In fact, cross-sections derived from porosity maps of several F2 reservoir intervals indicate a zone of higher porosities, and therefore larger pore throats, in the structurally highest part of the field. No porosity trends characterize the flanks (Figure 3).

A few fields in the San Joaquin basin have tilted oil-water contacts resulting from hydrodynamic effects. For example, Coalinga field has an oil-water contact with a tilt of 90 ft/mi (Hubbert, 1953). Similarly, the basal Etchegoin pool at Yowlumne field has a steeply inclined contact of 245 ft/mi. Both pools have 35° API oil and strong fresh-water drives. In comparison, South Coles Levee supposedly has a tilted oil-water contact of 175 ft/mi associated with a weak salt-water drive beneath a 35° oil pool.

The slope of an oil-water contact (*dZ/dl*) in a hydrodynamic system increases proportional to the steepness of the hydrodynamic gradient (*dh/dl*) and is inversely proportional to the density contrast between the oil and water. If a buoyancy factor known as the tilt amplification factor (T.A.F.) is calculated (Equation 2), the amount of tilt can be estimated from Equation 3 (Hubbert, 1953). If South Coles Levee field has a salt-water drive with a water density ($r_w$) of 1.03 g/cc, Coalinga field a fresh-water drive ($r_w$ = 1.00 g/cc), and both fields have 35° API oil ($r_o$ = .85 g/cc), then South Coles Levee has a tilt amplification factor of 5.7 and Coalinga has a factor of 6.7.

$$(2)\quad T.A.F. = r_w / (r_w - r_o)$$

$$(3)\quad dZ/dl = T.A.F. * (dh/dl)$$

If both fields have the same hydrodynamic gradient, an oil-water contact with a tilt of only 76 ft/mi is calculated for South Coles Levee (Equation 4).

$$(4) \quad (dZ/dl)_{co} / TAF_{co} = dh/dl = (dZ/dl)_{scl} / TAF_{scl}$$

$$(TAF_{scl}/TAF_{co}) * (dZ/dl)_{co} = (dZ/dl)_{scl}$$

$$(5.7/6.7) * 90 \text{ ft/mi} = 76 \text{ ft/mi}$$

However, South Coles Levee has a lower hydrodynamic gradient than Coalinga. Thus, the South Coles Levee oil-water contact should tilt less than 76 ft/mi.

A tilted oil-water contact of 175 ft/mi can develop beneath a 35° oil pool if a salt-water drive is present with a hydrodynamic gradient of 30 ft/mi (Equation 5).

$$(5) \quad dh/dl = dZ/dl / T.A.F. = 175 \text{ ft/mi} / 5.7 = 30 \text{ ft/mi}$$

If permeability, porosity, and the hydrodynamic gradient are known, the hydrodynamic flow can be calculated using a form of Darcy's Law (Equation 6). Note that K is hydraulic conductivity, not permeability.

$$(6) \quad v = (K/\emptyset)(d\,h/d\,l)$$

Assuming a reservoir permeability of 35 md (which equals a hydraulic conductivity of 35 ft/yr), an average porosity of .18, and using the previously determined hydrodynamic gradient of 30 ft/mi (which equals a unitless value of $5.7 \times 10^{-3}$), then a tilted oil-water contact of 175 ft/mi requires a 1.1 ft/yr flow of water beneath the oil, a rate sufficient to completely exchange the entire volume of fluid filling a pore space thousands of times in just a few years.

The reservoirs at Coalinga field outcrop nearby, whereas those at South Coles Levee do not outcrop at all. Thus, Coalinga should have stronger hydrodynamic flow. Furthermore, there is no diagenetic or geochemical evidence for movement of large volumes of pore fluids at North Coles Levee (Boles, 1987; Wood and Boles, 1991). The same probably holds true for adjacent South Coles Levee. If so, hydrodynamic flow at South Coles Levee is minimal, and possibly static. As such, the oil-water contact should tilt less, not more, than at Coalinga, particularly since South Coles Levee has a larger oil-to-water density contrast.

This analysis strongly indicates that the F2 oil-water contact at South Coles Levee is not tilted. Segregation of the reservoir into compartments with separate oil-water contacts is more likely. The Stevens sandstone at South Coles Levee contains three documented reservoir compartments — the F1, 14-12 and F2 (Dosch, 1962). Seismic, well log, core, and pressure data indicate further segregation of the F2 into three or more reservoir units (e.g., upper, middle, and lower F2 in Figure 4). Possibly, these reservoir units represent additional compartments that are not in pressure communication with each other (Clark et al., 1994). Thus, higher oil-water contacts at the western end of the field may represent fluid contacts in F2 sequences that are not in pressure communication with oil-water contacts in structurally lower F2 sequences on the eastern end. If so, additional oil accumulations are possible in F2 compartments on the western end of the field below the classically-defined oil-water contact (Figure 4).

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## Acknowledgments


I would like to thank ARCO Western Energy and Marathon Oil Company for permission to publish this article.

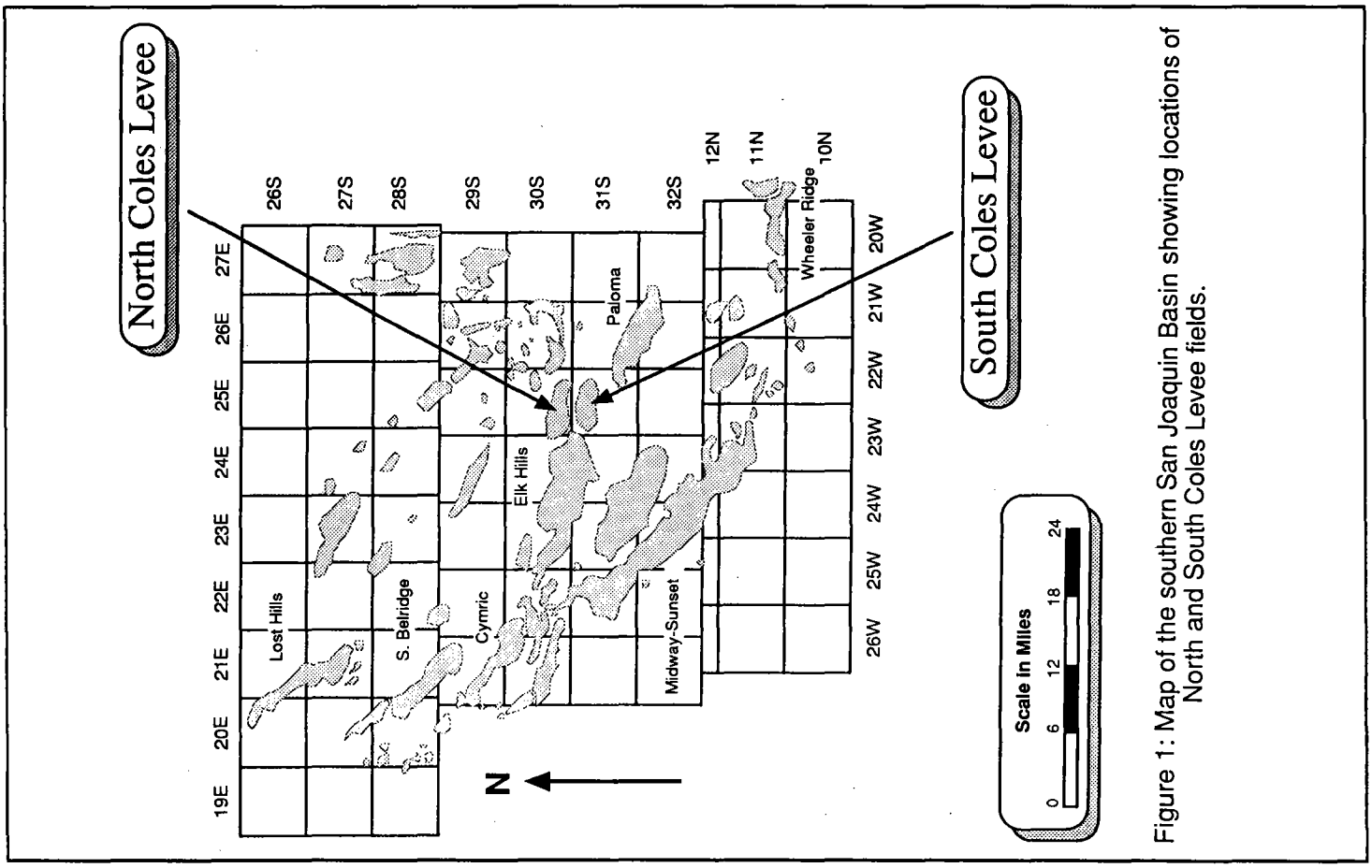


Figure 1: Map of the southern San Joaquin Basin showing locations of North and South Coles Levee fields.

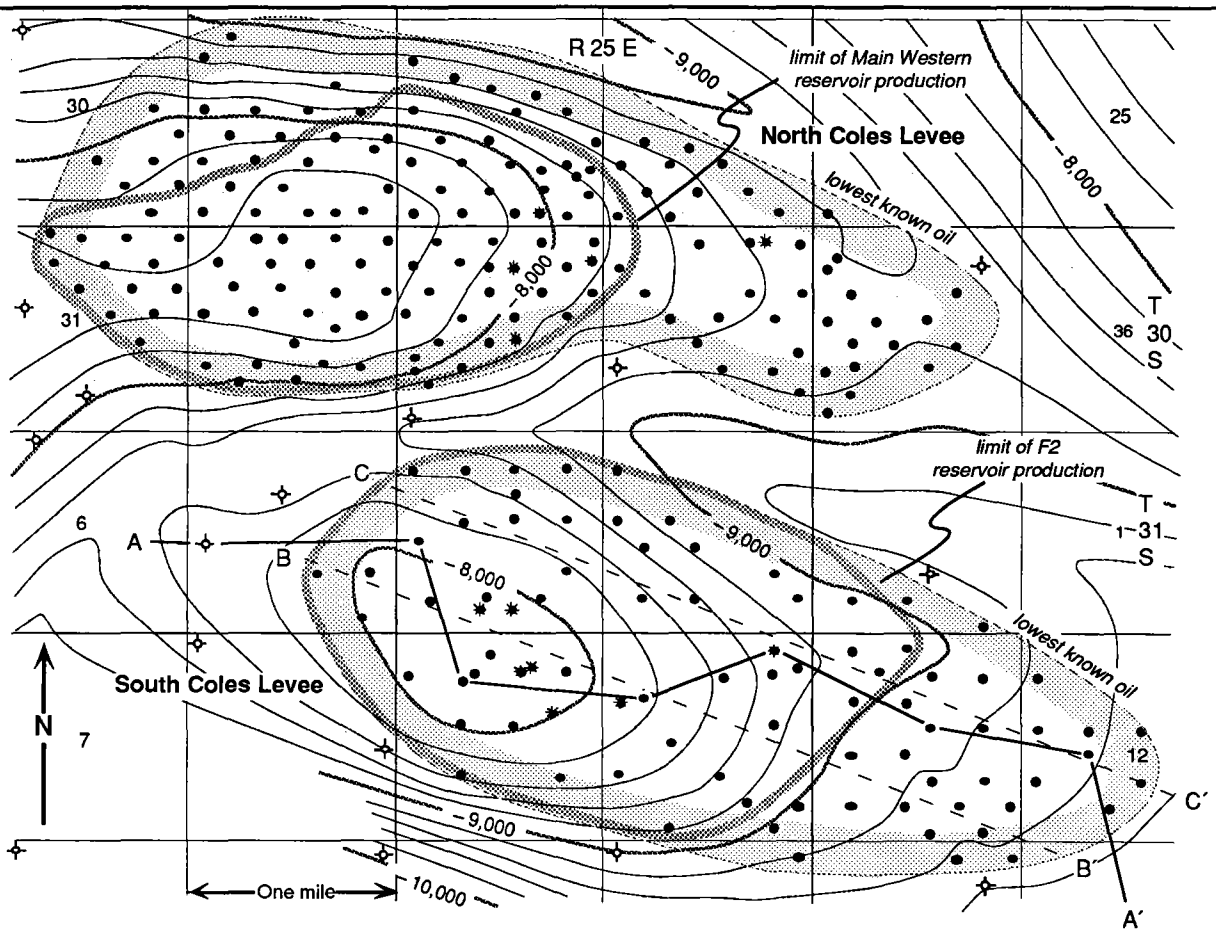


Figure 2: Structure contours on the N marker showing lowest known oil in upper and middle Stevens reservoirs (i.e., above the P chert) at North and South Coles Levee fields (modified from Levorsen, 1967).

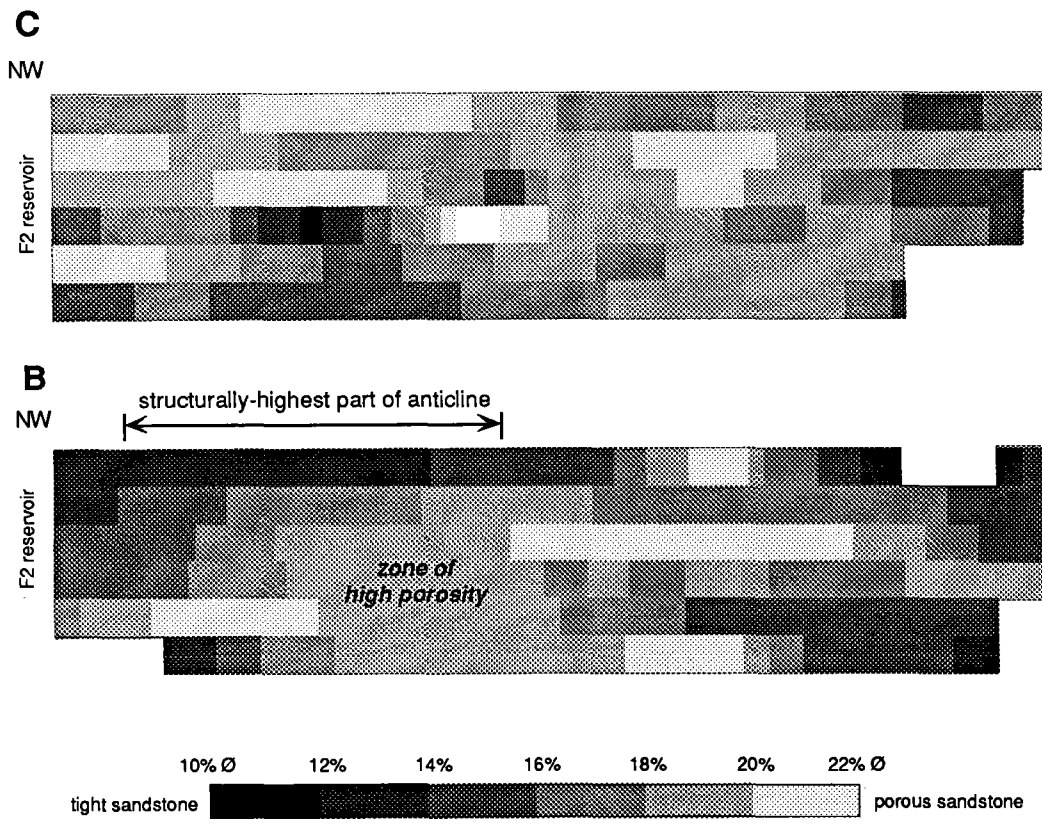


Figure 3: Cross-sections showing porosity distributions in the F2 reservoir.

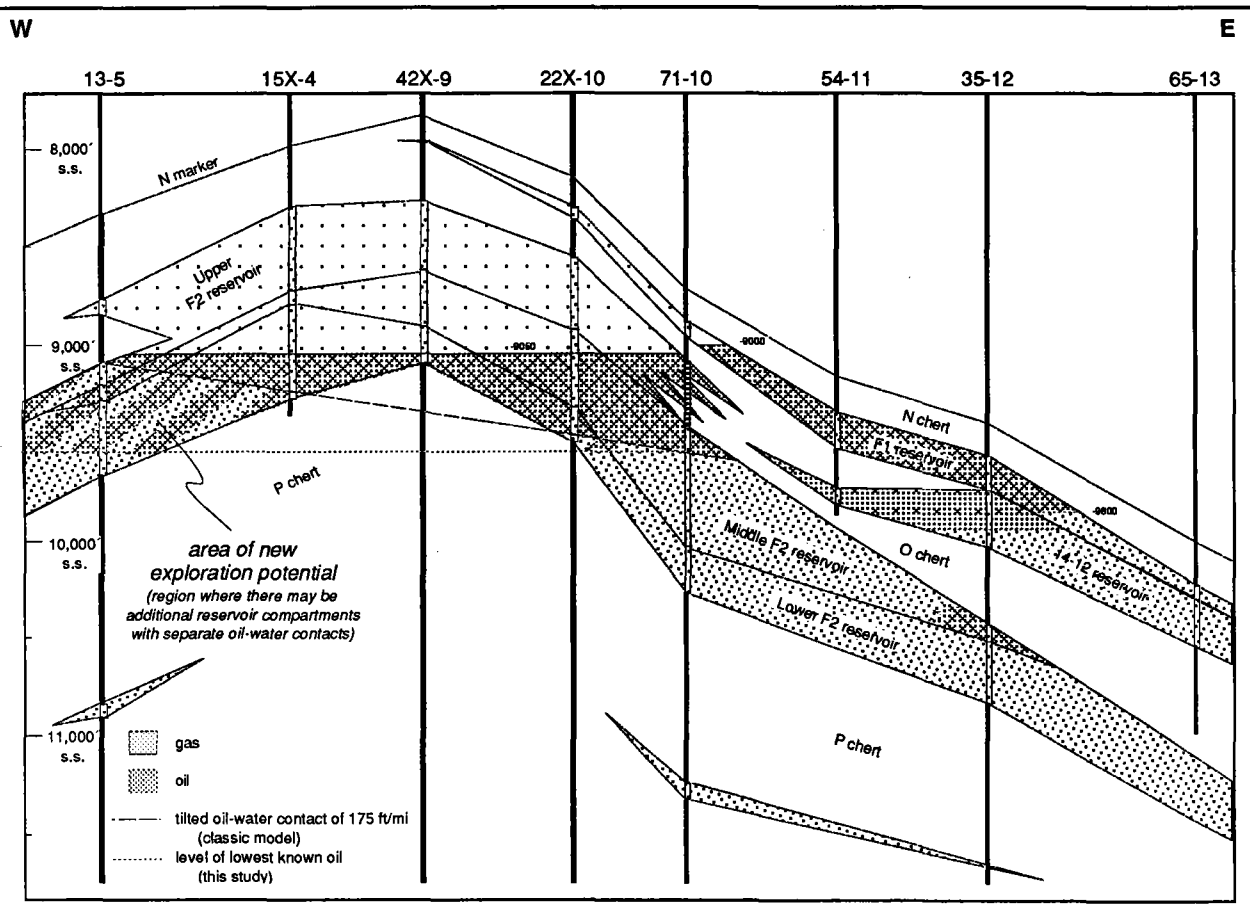


Figure 4: Cross-section showing fluid contacts at South Coles Levee Field. The entry of gas- and oil-cut mud, but no water, during drill-stem tests of the F2 zone in the 13-5 well indicates that the reservoir is tight, not wet.

## 1994 Fall Field Trip

### Sedimentary and Paleontology of Eocene Rocks in the Sespe Creek Area

*Saturday & Sunday, October 1-2, 1994*

**Cost:** **Professional members - $70 (one day - $40)**
**Students - $35**
**° Price includes guidebook, transportation, meals, refreshments, and campfing fee. Motel rooms (not included) are available in Ojai for those interested.**

**Application deadline is Friday, 9/23/94.**
**Please send check to: Pacific Section, SEPM**
**Stanley Finney, Treasurer**
**Dept. of Geological Sciences**
**California State University**
**Long Beach, Ca 90840-3902**

## *Delegate's Corner: Summary of Activities at the 1994 AAPG National Convention*

The recent trend to broaden AAPG's membership base was clearly evident at the annual House of Delegate's meeting at the AAPG National Convention in Denver. In an effort to improve membership, the House voted to revise the qualifications for Associate Members to include non-geology professionals such as engineers and landpeople working in industry. Associate Members, as defined by the bylaws, are nonvoting members of AAPG.

AAPG's growth overseas continues with the House's approval of applications by Azerbaijan, New Zealand and Nigeria to become Affiliated Societies of AAPG. However, a proposal to enlarge the Executive Committee of AAPG to include an International Vice President failed to be approved.

The number of members residing in the Pacific Section continues to fall more rapidly than in any of the other sections of AAPG. As a result, the Pacific Section is now the smallest of the sections, with only 8.1 percent of the membership. Fewer members translates into reductions in representatives at the House of Delegates and less influence of the Pacific Section at the national level. Our current level of presentation can only be maintained through continued recruitment of qualified geologists to AAPG.

*— S.A. Reid*
*SJGS Delegate*



## *San Joaquin*

The meetings are held at the American Legion Hall at 2020 "H" Street in Bakersfield. Attitude adjustment starts at 6:00 p.m. and dinner is served at 7:00 p.m. For more information and reservations, please contact Mike Clark at (805) 632-6254.

### *ANNUAL FALL BBQ AND GOLF SCRAMBLE FRIDAY, SEPT. 9TH*

BBQ

Place: *Stramler Park*
Time: *Attitude Adjustment- 5:00 p.m.*
*Dinner - 6:00 p.m.*
Cost: *Prepaid - $14.00*
*At the Dinner - $17.00*
*Children (under 12) - $5.00*

Questions? Call Betty @ 805-395-5353

GOLF

Place: *Kern River Golf Course*
Time: *8:00 a.m.(earliest tee time)*
Cost: *$31.00 per person (includes green fees, cart, lunch & prizes)*

DEADLINE: SEPTEMBER 2, 1994

Questions? Call Les @ 805-397-7472

## *Alaska*

The Alaska Geological Society holds monthly meetings from September to May. The meetings are held at the Anchorage Hilton Hotel from 11:45 a.m. to 1:00 p.m. Lunch and a guest speaker are provided for a fee of $15.25. For those wishing to hear the speaker only, admission is free. For more information, please contact Sue Karl at (907) 786-7428.

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## Coast

Date: *Tuesday, September 20,*
Location: *American Legion Hall, 83 S. Palm Street, Ventura, CA*
Time: *6:00 P.M. - Social*
*7:00 P.M. - Dinner*
Cost: *$12.00 with reservation*; $15.00 w/o reservation, $5.00 students*
Speaker: *DR. FRANK MONTASERO*
China Lake Naval Weapons Center
Topic: *"Geothermal Potential in the Neogene Extension, Indian Wells Valley".*

*Future Speakers and Topics include:*

*10/18- DR. PETER WEIGAND – C.S.U.N. "Geology of Santa Cruz Island" (Preparatory talk for Santa Cruz Island field trip)*

*11/4 - 6/94; Fall field trip to Santa Cruz Island (contact Dale Kunitomei at 818-991-0526.*

*11/15/94 - MIKE CLARK – ARCO "Sedimentation Response to Earthquake Related Events, Middle Eocene, Ventura Basin"*

*12/20/94 - TERRY ADCOCK - UNOCAL "Geology, Anchaeology and snorkeling potential of Delize and Guatemala"*

** Reservations are required to guarantee dinner.*

Reservations: *phone the receptionist at GroundwaterTechnology (805) 644-9811 by 10 A.M. at least one day before day of the meeting.*

## Los Angeles Basin

Luncheon meeting alternate third Thursdays at noon at Unocal Center, Los Angeles.

## Sacramento

Meetings are held the second & fourth Wednesdays at the Hungry Hunter Restaurant, 450 Bercut Drive, Sacramento. Lunch starts at 12:00 noon and we try to be out at 1:30 p.m. Cost is $10. Up coming speakers are as follows:

8/24 - Robert Reid - District 6 Supervisor

9/14 - Rick Minter - SMUD's co-generation projects and the utility's upcoming demand for natural gas.

9/28 - Derek Jones - Natural gas pipelines of the Sacramento Valley; the economics and competition.

## Northwest

Luncheon meeting second Friday of each month, October through June, as announced.

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## Northern California

Date: *Thursday, Sept. 22, 1994*
Location: *Holiday Inn, 2730 North Main St., Walnut Creek*
Time: *6:30 P.M. – Social;*
*7:00 P.M. – Talk*
Cost: *$5.00*
Speaker: *BOB COX*
*OHM Remediation Services*
Topic: *"Application of Soil Vapor Extraction for Remediation of the Vadose Zone"*

*Future Speakers and Topics include:*

*10/20 (evening) - JAMES C. INGLE, JR., STANFORD*
*"Geology of Baja California and the Gulf of California"*

*11/17 (evening) - JAMES G. MOORE, U.S.G.S.*
*"Tsunami Deposits of Hawaii"*

Reservations: *510-355-8005 (Leave your name on the NCGS recorder by Tuesday, Sept. 20, 1994)*

# REQUIEM FOR MARATHON

More than five decades of operation in California by Marathon Oil Co. and its. predecessor, The Ohio Oil co., are coming to an end.

Marathon is turning over the operating reins, of the South Coles Levee to ARCO Western Energy, though it will retain its 37.7 percent interest. The field was the last that Marathon operated in California.

The long Marathon/Ohio identification with California produced more than one highlight in the state's oil and gas history. One of the first began to unfold in November 1937 when the predecessor company, Ohio Oil, spudding in with a Buaas Drilling Co. rig out of Bakersfield to drill a wildcat seven miles northeast of Willows.

On January 7, 1939, while the crew was preparing to pull drill pipe from a depth of 4,505 feet, the well blew out. Efforts to close the blowout preventers failed. By the following day, the drilling rig and all the associated equipment except for the boilers had disappeared in the large crater formed by gas blowing at a rate estimated in excess of 20 million cubic feet per day. Accompanying the gas was a large volume of salt water.

The wild well flowed out of control for 21 days before the flow ceased on February 1, leaving a crater approximately 200 feet in diameter and about 70 feet deep. Ohio drilled another well near the crater, completing the hole in August of that same year for 5.4 million cubic feet of gas per day. The well as the first completion was credited with discovery of what today is the Willows-Beehive Bend gas field, a major field that has produced more than 369.4 billion cubic feet of gas.

Three months later, The Ohio Oil Co. chalked up its first major oil find in California with completion of an exploratory well on Kern County Land Co. property 15 miles southwest of Bakersfield. The South Coles Levee field would produce 57.7 million barrels of oil and 419.9 billion cubic feet of gas before Ohio's successor, Marathon, signed off as operator.

After oil production from South Coles Levee peaked in 1947 and decline set in, Ohio Oil cast about for a new challenge. The nearby Paloma field offered such a challenge. Under terms of the original Paloma lease with Kern County Land Co., Ohio was committed to drill a test of the Eocene sand or give up rights to the prospective deep pay. It was theorized the sand might lie at a depth of 18,000 feet or more. Before time ran out on the commitment, Ohio moved in a powerful rig and on October 23, 1951, spudded in with company crews to drill the Paloma deep test. On the early afternoon of August 20, 1953, with Driller Frank Sherman on the brake, the exploratory well broke the previous world's depth record of 20,521 feet and continued drilling ahead. The well subsequently bottomed at 21,482 feet. A fishing job ensued. After 202 days of roundtrips, crews had cleaned out to 17,237 feet. Ohio tested without commercial encouragement. The well was the last in California to hold the title of deepest well in the world. It was converted to service as a water disposal well and eventually abandoned in 1992.

While Ohio became Marathon and the search for production continued onshore and offshore California, the last had not been heard from the wild well at Willows. Gas and salt water had begun to fill the crater before the end of 1938. To stop the flow, Ohio in September of that year drilled a relief well, through which more than 5,900 barrels of mud and 2,500 sacks of cement were pumped into the subsurface strata at 2,240 feet. In late October, the flow of gas and saltwater ceased.

The final word had not been written. By 1949, saltwater had formed a lake in the crater and gas kept bubbling to the surface. As time passed, the crater increased in size and the water level often fluctuated, occasionally overflowing.
In 1991, Marathon went back into the relief well, deepenod the hole and directionally drilled to a point near the borehole of the wild well. The company killed the flow with cement and mud, then backfilled the crater with 47,616 cubic yards of gravel, delivered in 12, 857 truckloads. Along with removing the environmental hazard, the fill provided additional pressure over the saltwater and gas entry zone. The project was completed in November 1991. The cost was approximately $900,000.

*— Bill Rintoul*
*Historical Editor*

## CONFIDENTIALITY OF WATER WELL DRILLERS REPORTS — AB 2530

This bill was proposed by the Groundwater Committee of the Association of California Water Agencies (ACWA). Isn't that cute? Its purpose was to make drillers reports of water wells available to the public much like the drilling records of oil and gas wells. The importance of this is obvious to all you geologists, but the big influential farmers take a dim view of it.

The Assembly passed a modified, but acceptable, version of the bill on May 26. The vote was 45 to 28. It required that geophysical logs be submitted along with the usual drillers reports, that reports be made available to public agencies, to anyone who has written permission of the well owner, and to registered geologists, geophysicists, and civil engineers in areas within the boundaries of an urban water supplier.

It went to the Senate on the same day, and the Senate Agriculture and Water Resources Committee made these amendments on June 28: A geologist, geophysicist, or civil engineer who acquires a drillers log in an "urbanized area" shall not make copies available to others: a well owner may hold his well logs confidential from G, G, and CE's by submitting a certified letter to the filing agency, and parcels of 20 or more acres shall not be considered part of an "urbanized area".

On July 5, the Ag and WR Committee made a further amendment limiting the 20-acres referred to above down to 10 acres, by a 6-0 vote. It then went to the Senate Appropriations Committee which was expected to pass it. As of July 27, no date had been set for the vote in the full Senate. I do not yet have a copy of the final Bill.

The Bill as it now stands has been watered down considerably from the original intention, but it is still a significant step forward in availability of water well drillers reports and geophysical logs to the scientific community. Who knows? If we keep this up, California my join the enlightened company of the other 49 states.

I URGE EVERY ONE OF YOU TO CONTACT YOUR STATE SENATOR TO VOTE FOR THIS MEASURE. IMMEDIATELY.

*— Harold Sullwold*
*Registered Geologist #635*
*Honorary Life Member, Pac Sec. AAPG*

1994 Annual Symposium
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# SACRAMENTO TEAM PROVIDES TECHNICAL SUPPORT TO REPUBLIC OF ARMENIA - AMERICAN TECHNOLOGY SOUGHT

A Sacramento group has recently completed a two part contract for the United States Trade and Development Agency of the U.S. Department of State to provide technical support to the Republic of Armenia, one of the Independent Commonwealth States which previously was part of the USSR. The contract was administered by the California Energy Commission. Armenia's lack of energy sources has caused severe hardship for the country. Causes for the energy shortage have been the curtailment of natural gas coming from Russia, earthquakes which caused the shutdown of the nuclear power plant and a nonproductive oil and gas development program.

The first part of the contract developed an oil and gas reserve profile of Armenia by evaluating existing geological, seismic and well data. The team determined drillable sites, and designed other prospects which are candidates for further examination. The team carrying out this effort included Roland Bain, Lead Geologists; Herb Wheeler, reservoir engineer; Arsen Shahnazarian, in conjunction with EnergyLog, Corp., drilling engineer; Dale Gray, geophysicist; and John Wheaton of Mariposa Petroleum, project coordinator. Their report is soon to be released by the California Energy Commission.

The second part of the contract consisted of advising the Armenian government on organizational and operational elements of establishing a National Petroleum Development Program. As part of this program, the government wishes to attract American companies to Armenia to undertake oil and gas exploration. The team advised the government on various aspects of petroleum exploration/production agreements, and conducted special training sessions on these agreements. The team also compiled a political and economic profile of the country. Assisting John Wheaton on this task were Gerhard Jansen, retired Occidental Petroleum executive; Libby Taber-Smith, energy consultant; and professors Drs. Ralph Gaedeke and Dennis Tootelian of Sacramento State University.



# SANTA PAULA UNION OIL MUSEUM

Visit the fully restored, historic 1890 home of Union Oil (Unocal) in beautiful downtown Santa Paula! One of Ventura County's oldest commercial buildings, both the interior and exterior have been meticulously restored to reflect how the building appeared more than one hundred years ago.

The museum is designated a historical landmark and is listed in the National Register of Historic Places. We are dedicated to preserving the history and technology of the oil industry and feature videos, hands-on displays, and artifacts used by early oil industry pioneers in Ventura County. A separate building houses an authentic steam powered cable tool drilling rig used by the oil pioneering wildcats in the late 1800's.

In addition, special exhibits provide fun for the entire family. "Splinter Road: Motorcycle Racing Pioneers" will be at the museum until June 26 and features vintage racing motorcycles that are rare and unique. These beautiful machines can't be found anywhere else! Opening, July 7 will be an historical and future) view of Santa Paula and her architecture, "Building History: A Century of Architecture in Santa Paula". October 1 will usher in a railroad exhibit focusing on the Santa Clara River Valley.

The museum is located at 1001 East Main Street in the heart of Santa Paula, and can be reached at (805) 933-0076. We're open Thursday through Sunday from 10:00 until 4:00, and we'll be happy to arrange special tours for your group. Call us!

## Productive Low-Resistivity Well Logs of the World

*We Need Examples and Company Coordinators!*

The Houston and New Orleans Geological Societies recently published a highly successful guidebook entitled 'Productive Low Resistivity Well Logs of the Offshore Gulf of Mexico.' We have nearly sold out all 1500 copies of this exciting publication in less than a year. Almost one hundred people contributed to the success of this guidebook.

Now we've decided to publish "a sequel" with examples from all around the world, This volume will be an even greater undertaking than the Offshore Gulf of Mexico Guidebook, so we need more help from more contributors. We need examples from the onshore Gulf Coast to the huge fields of Russia and China; from Indonesia, Malaysia, and all of the great fields of the North Sea; from Africa, Australia, South America, and the Middle East to the giants of Alaska, Canada, Mexico, California, the Mid-Continent and the Permian Basin.

Gather up your well data and photocopy the logs and core data from a potentially "famous" zone. Send it, along with its cumulative production totals (minimum of 6 months production), your name, address, and telephone number to:

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New Orleans, LA, USA, 70112

The committee will quickly examine your "candidate pay zone", then send you an 'Official Example Submittal Kit". Take your pick from either an easy-to-use 5" log format sheet designed for easy tracing and drafting, or a digital diskette with the format forms and instructions designed for Autocad v.11.or 12.0. Submitting your favorite examples will only take only a few minutes in the file room and at the copy machine.

Become a valuable member of a successful team of enthusiastic formation evaluators. Better yet, be one of our "Official Coordinators"! We want to designate at least one person at each company, or in each region or basin of the world, to lead and encourage their colleagues to generate multiple examples. Call Glen at (504) 592-7057 or Clint at (713) 874-8730 to volunteer, or to ask questions.

HELP US CREATE A SECOND GUIDEBOOK OF EVEN GREATER VALUE! We can't wait to show the world the unusual pay zones that have remained hidden over the years!

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| **SELECTED PAPERS** | | | | |
| •1-1 | Selected Papers of the Pacific Section AAPG 1983 Annual Meeting, Sacramento, California No. 1 Vol. 1: AAPG, 1983 – R.L. Hester and D.E. Hallinger (eds.) (Eel River Basin, Sacramento Basin, Half Moon Bay Oil Field, Pacific Northwest) | 4.00 | ___ | ___ |
| **GUIDEBOOKS** | | | | |
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| •MP 8 | A Symposium of Papers Presented at the 40th Pacific Section AAPG Convention, Bakersfield, CA: AAPG, 1965, E.W. Rennie, Jr. (ed.) (Asphalto, Dutch Slough,Semitropic-Trico, Traps in Stevens Sands). | 3.00 | ___ | ___ |

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| •MP 11 | Preceedings of the North Slope Seminar, Palo Alto, CA: AAPG/NCGS, W.L. Adkinson and M.M. Brosge', USGS (ed.) | 4.00 | ___ | ___ |
| •MP 12 | Program Abstracts-Second International Symposium on Arctic Geology:AAPG/SEPM/SEG, 1971, | 1.00 | ___ | ___ |
| •MP 13 | Program Preprints, 1972 Annual Meeting, Bakersfield, CA.: AAPG/SEPM, Pacific Section (Miocene rocks in the Sierra Madre, Sawtelle Field, Geology and Oil Potential Ventura Basin, Tejon Fm in San Emigdio Mts. Markley Gorge Sacramento Basin). | 5.00 | ___ | ___ |
| •MP 14 | Selected Papers Presented to the San Joaquin Geological Society, Vol. 4: SJGS, 1972 (Ground Water Hydrology in Southern San Joaquin Valley, Meganos Gorge, Sherman Island, Sacramento Valley), H.E. Sugden (ed.) | 2.00 | ___ | ___ |
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| •MP 35 | Selected Papers Presented to the San Joaquin Geological Society, Vol. 6: SJGS/AAPG, (Yowlumne, East Brentwood, Edison, Lost Hills), G.W. Kendall and S.C. Kiser (eds.)1984 | 4.00 | ___ | ___ |
| •MP 36 | 62 Years: History of the Pacific Section AAPG: AAPG, 1985, C.F. Green (ed.) | 4.00 | ___ | ___ |
| •MP 37A | Organic Geochemistry in Oil Exploration: AAPG, R.W. Jones and R.P. Phillip, 1987 | 5.00 | ___ | ___ |
| •MP 37B | Tectonics, Sedimentation and Evolution of the Eel River and other Coastal Basins of Northern California: SJGS/AAPG, 1987, H. Schymiczek and R. Suchsland | 9.00 | ___ | ___ |
| •MP 38 | Selected Papers Presented to the San Joaquin Geological Society, Vol. 7: SJGS/AAPG, 1988, Landslide Oil field, Upper Miocene Turbidites Depositional Environments and the Eocene Domingine Fm. | 8.00 | ___ | ___ |
| •MP 40 | Environmental Field Trip Guidebook, 1991 Pacific Section AAPG/SEPM/SEG Annual Convention, Bakersfield, CA: AAPG/SJGS, 1992, R.J. Menzie and H.B. Schymiczek (eds.) | 4.00 | ___ | ___ |
| •MP 41 | Structural Geology of the Sacramento Basin: Symposium Presented at the 1992 Pacific Section AAPG/SEPM/SEG/ EMD Annual Convention: AAPG, 1992, V.B. Chevron and W.F. Edmondson (eds.) | 19.00 | ___ | ___ |
| •MP 42 | Symposium on the Applications of Horizontal Drilling Techniques in California. San Joaquin Geological Society/Cal. State University Bakersfield: AAPG/SJGS, L.C. Knauer (ed.)1992 | 15.00 | ___ | ___ |

## CROSS SECTIONS

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## *Recommended Reading...*

AAPG BULLETIN

Vol. 78, No. 5 (May, 1994)

Early Carboniferous Transgression on a Passive Continental MarginL Deposition of the Kekiktuk Conglomerate, Northeastern Brooks Range, Alaska, D.L. LePain, et. al.

Vol. 78, No. 7 (July, 1994)

Late Cenozoic Tectonics of the East Ventura Basin, Transverse Ranges, California, R.S. Yeats, et. al.

GEOLOGICAL SOCIETY OF AMERICA BULLETIN

Vol. 106, No. 5 (May, 1994)

Active Faulting and Growth folding in the Eastern Santa Barbara Channel, Califor., J.H. Shaw et.al., P. 607

SEDIMENTOLOGY

Vol. 41, No. 1

Sedimentology of Subaqueous Volcanicalistic Sediment Gravity Flows in the Neogene Santa Maria, Basin, Calif., P. 37

BOOKS

Kings of Creation, D. Lessen, 1992, 367 pages, Simon & Schuster, New York, $25 cloth. "A well written introduction to the major personalities and people involved in modern dinosaur theory. Å warts and all examination of their research and methods."

## California Well Sample Repository Publication No. 4

The California Well Sample Repository has issued the fourth in its series of special publications. Titled, Open House Display of Potter and Spellacy Sands from Midway-Sunset Field Kern Co., California, this 33 page publication contains both technical and historical information.

The publication has articles documenting the naming of the Spellacy and Potter, four abstracts of papers dealing with the subject formations, and one article on cyclic-steam-induced diagensis. Included in these are ten figures, two cross sections, two color core photos made in both UV and plain light, two color geologic maps and computer generated composite color enhanced logs.

Contact Russ Robinson at (805) 664-2324 to order. Cost is $5.00, plus postage.

DEADLINE FOR FALL ISSUE NOVEMBER 1, 1994



NEWSLETTER of the Pacific Section–American Association of Petroleum Geologists is published quarterly by the Pacific Section. Matericl for publication, requests for previous copies, and communications about advertising costs should be addressed to LARRY KNAUER Bechtel Petroleum Operations, Inc., P.O. Box 127, Tupman, CA 93276.. CHANGE OF ADDRESS, subscription, and membership inquiries should be directed to: MEMBERSHIP SECRETARY, PACIFIC SECTION AAPG, P.O. Box 1072, Bakersfield, CA 93302. To order publications, write to: PUBLICATIONS COMM.: Pacific Section–AAPG, P.O. Box 1072, Bakersfield, CA 93302.

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# PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

*of the Pacific Section*

*American Association of Petroleum Geologists*

FALL 1994 NO. 4


## PRESIDENT'S MESSAGE

Well the year is moving quickly and as you read this, we're entering winter. Also moving quickly are the plans for the 1995 convention in San Francisco. Final plans are being made and lots of people are burning the midnight oil getting their abstracts into shape for submittal. Don't you be left out. Set aside a few days in early May and plan to attend. As an added incentive, everyone registering early will get a free copy of the "History of the PS–AAPG" volume added to their registration package. If any extra copies remain, they'll be given out on a first come, first served at the registration desk.

The PPG newsletter is increasing to a 5 issues per year schedule with publication planned for every 2 months and a hiatus in the summer. The more frequent publication will permit better and more timely news reporting (especially for local society activities). If finances continue to improve, we may go back to the 6 issues per year format sometime in the future. Newsletter editor Larry Knauer, PS–AAPG's renaissance man, continues his efforts to reduce the newsletter printing and mailing costs while also increasing advertising revenues. Another improvement we have to look forward to is the inclusion of a date on the mailing label indicating when your membership dues are expiring. This will help forgetful people like myself who are always unsure if they have mailed in their current years dues statement.

The PS–AAPG Executive Committee has a new committee member. We're pleased to welcome Jim Weddle as the new Finance Chair. Jim has previously served the PS–AAPG in a variety of positions including President back in 1983-84. His sage advice and business savvy are needed to help PS–AAPG through these difficult and changing times. Since change is a constant theme these days, it is not surprising that my phone number has changed. Starting November 1, I can be reached at [805] 633-4508 and my fax number is 633-4345. I'm still working for Chevron so my address remains the same. Please continue to call with your suggestions on how PS–AAPG can improve and be of greater value to you.

*— Robert Countryman*

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## DUES NOTICE

About one half of you have recently received post cards reminding you that your dues for 1994-95 have not been paid. Please take this opportunity to send them in now. A new AAPG/SEPM/SEG Pacific Section Directory will be published soon! If your dues are not paid at the time of publication, you will not be included in the new directory.

## Northwest

The Port Angeles Symposium was GREAT! Weather perfect, food great, and the program outstanding. Approximately 40 members attended the meeting. The Sunday evening "Ice Breaker" set the tone for the gathering with the very generous buffet hosted by Oregon Natural Gas Development Corp., Weyerhaeuser Co., and the law firm of Stoel, Rives, Boley, Jones & Grey.

The program on Monday, September 19th, included 9 very well presented talks dealing with subjects ranging from "Structural Evolution of the Olympic Subduction Complex" to "Tsunami Hazards along the Northwest Coast." Other topics included "Coalbead Methane", "Gas Transportation & Storage", "Frazer River Drilling" and "Deep Basin Gas Potential".

The Tuesday, September 20th field trip led by Alan Niem, Geology Professor, was a perfect climax to the Port Angeles meeting as those who went along took in the beauty of the coastline along the Strait of Juan de Fuca.

And certainly not to be forgotten, the meals were outstanding.

Congratulations to Peter Hales, Program Chairman, Jon Griffin, Vice-Chairman; and David Pauli, Arrangements Chairman, all of Weyerhauser Company. Many thank-yous as well to all of the speakers who made this one of the Association's best seminars.

**SYMPOSIUM PAPERS**

You may obtain a copy of the 1994 Symposium Papers by writing:

*Oregon Department of Geology & Mineral Industries*
*attn: Klaus Nevendorf*
*800 NE Oregon St., #28, Ste. #965*
*Portland, OR 97232*

Jack Meyer, Oregon Natural Gas Development, has agreed to serve on the 1994-95 Nominations Committee for the AAPG.

## Los Angeles Basin

Luncheon meeting alternate third Thursdays at noon at Unocal Center, Los Angeles. ***No report.***

## Coast

Date: *Tuesday, December 20*
Location: *American Legion Hall, 83 S. Palm Street, Ventura, CA*
Time: *6:00 P.M. - Social*
*7:00 P.M. - Dinner*
Cost: *$12.00 with reservation; $15.00 w/o reservation, $5.00 students*
Speaker: *TERRY ADCOCK*
UNOCAL
Topic: *"Geology, Archaeology and Snorkeling Potential of Belize and Guatemala"*

*Future Speakers and Topics include:*

*1/17/95 - DR. GERRY SIMILA – CSUN* "Northridge Earthquake Update"

*2/21/95 - MILES HAYES – AAPG Distinguished Lecturer* "Oil Spill Behavior"

Reservations: *phone the receptionist at GroundwaterTechnology (805) 644-9811 by 10 A.M. at least one day before day of the meeting.*

## Sacramento

Wednesday, 12/7/94 – Holiday Guest Day-For Spouse or Friend. Fun & Educational movie "The Wildcatters". Reservation needed. Call Nancy @ 916-485-9164. Plan now/Ask now!! Bring your spouse or friend to join us at the year end holiday meeting of the SPA. "The Wildcatters" shows the development of the natural gas and oil industry i California. Good flick, all of us in the industry come out as heroes. There will be song, prizes and holiday cheer! Come join the fun, even if you come alone.

## Alaska

***No report.***

Alaska Geological Society
P.O. Box 101288
Anchorage, AK 99510

## San Joaquin

The speaker for the December 13, 1994 dinner meeting will be Thom Davis of Davis and Namson. His talk is entitled "Structure and Hydrocarbon Potential of the Pakistan Fold Belt."

The January 10, 1995 dinner meeting will feature Donald Yeoman's talk "Cosmic Collisions and Near Earth Objects."

The February 14, 1995 dinner meeting will have a Valentine's Day theme with spouses or significant others encouraged to attend. The guest speaker will be announced at a later date.

Dinner meetings are held the second Tuesday of each month at the American Legion Hall, 2020 "H" Street, Bakersfield, CA. The social hour starts at 6:00 p.m. & dinner is served at 7:00 p.m.

### 1994–95 Pacific Coast S.E.G. Calendar

*Dec. 6* – SD Mtg – G. Dale Gray. History of Seismic Exploration in the Sacramento Valley.

*Dec. 7* – ND Mtg – G. Dale Gray. History of Seismic Exploration in the Sacramento Valley.

*Jan. 3* – SD Mtg – Rob Brooks (TGS). Subsalt Plays in the Gulf of Mexico and around the World.

*Jan. 4* – ND Mtg – Rob Brooks (TGS). Subsalt Plays in the Gulf of Mexico and around the World.

*Feb. 7* – SD Mtg – Rob Negrini (CSUB). Groundwater.

*Feb. 8* – ND Mtg – Rob Negrini (CSUB). Groundwater.

- *ND-Bakersfield, Ken Baird 805-321-6613*
- *SD-Los Angeles, Gordon Stewart 818-796-6836*

## Northern California

The Northern California Geological Society has begun an exciting 1994-1995 season with two excellent talks that were presented at its September and October monthly meetings. The first of these was given on September 22 by Robert E. Cox of OHM Remediation Services on the "Application of Soil Classification Systems in Soil Vapor Extraction Technology." Mr. Cox gave several illustrations of current soil vapor extraction technology for contaminant removal from the vadose zone, and offered his own personal insights into the more subtle problems involved with successfully applying this technique to soil remediation projects.

Dr. James Ingle from the School of Earth Sciences at Stanford University spoke to the NCGS at its October 20th meeting on "The Birth of an Ocean — The Geological Evolution of the Sea of Cortez and Baja, California." Dr. Ingle's presentation covered the Tertiary geological history of the Sea of Cortez (Gulf of California) and Baja, California, with particular emphasis on the stratigraphic evidence that supports the time of rifting events in this area.

Other speakers will be addressing the NCGS before the new year arrives. Dr. James G. Moore of the U.S. Geological Survey, Menlo Park, will speak on "Giant Hawaiian Landslides" at the November 17th meeting. On December 15th, Dr. Casey J. Moore of U.C. Santa Cruz will speak on "Faults as Barriers and Conduits to Fluid Migration."

The NCGS is greatly indebted to Chevron Overseas Petroleum, Inc. for its recent contribution to support the AAPG Distinguished Lecturer Series for 1994-95. At the present time, two distinguished lecturers are scheduled to speak at NCGS meetings in 1995. In February, Kenneth McClay will speak on 3D Fault Systems in Rifts, and in March, David Gillette will speak on the Real Jurassic Park. The AAPG Distinguished Lecturers highlight our technical program, and compliment our program of local speakers. The NCGS would like to express its thanks to Chevron Overseas Petroleum for continuing to make this lecture series available to its members.

This year the NCGS has a very aggressive field trip agenda set up by its Vice-President and Field Trip Coordinator, Tridib Guha. On October 15th, the members were treated to the geology of the Black Diamond Mines Regional Preserve in Antioch, CA. The trip was led by Dr. Ray Sullivan of San Francisco State University, who handled the geological interpretation of the well-exposed Tertiary sediments in this area, and by John Waters of the East Bay Regional Park District, who has spent the last 20 years painstakingly restoring the coal and sand mines there for public tours. This trip was entertaining from both a geological and a historical standpoint, and will no doubt be offered again.

On November 12, the NCGS is sponsoring a short field trip to the Blackhawk Fossil Mammal Quarry near Danville, Ca., on the Southwestern flanks of Mt. Diablo. The trip will be led by David Lawler of FarWest Geoscience Foundation. This quarry is a major site of upper Miocene vertebrate fossils, and has been operated by the U.C. Berkeley Museum of Paleontology since the 1930's. Attendees will also tour the paleontological exhibits from the quarry that are currently on display at the nearby Behring Museum.

Other field trips planned for 1995 include a Mt. Diablo Trip in April/May led by Ron Crane and Craig Lyon, two former Chevron geologists who ran two very well received trips to the mountain last year. Perhaps the most anticipated trip of the year will be an overnight transect of the northern Sierra Nevada range scheduled for June 10-11, 1995. Entitled "Tectonic Belts of the Sierra Nevada" it will be led by Dr. Howard Day of the University of California, Davis.

In addition to meetings and field trips, the NCGS is also active in education endeavors. The NCGS sponsors a program for youths ages Kindergarten through 12th grade called the K-12 Program. The purpose of this program is to introduce students and their instructors to the Earth Sciences by providing professionals to address the students and faculty in the classroom, and to assist on field trips to Bay Area rock outcrops. NCGS Counselor Craig Lyon is heading up this program, and can be reached for more information at 510-689-3849.

Craig is also an active supporter of the Lindsay Museum in Walnut Creek, originally known as a wildlife hospital that now takes an active role in educating all age groups on the Natural Sciences. The classes and presentations offered by the museum cover a broad range of wildlife, ecological, and related fields. Craig has generously donated his time to preparing geological and mineralogical exhibits for the museum, and is currently seeking volunteers who would be willing to give short afternoon presentations or short courses on earth science topics. Anyone interested in helping the museum with these programs, or who would like more information about the museum and its programs can call Pamela Stone at 510-935-1978 ext. 17, or Craig Lyon at 510-689-3849.

The NCGS regrets to announce that one of its members, Donald K. Cameron, passed away on February 2, 1994, in Franklin, Tennessee. Mr. Cameron had retired from Chevron Oil Corp. in September, 1992, where he had worked since 1954. He was a graduate of Phillips Andover Academy, McGill University, and Indiana University. He was on assignment with ARAMCO in Saudi Arabia from 1969-1978, and in Croydon, England from 1978-1980. At the time of his retirement in 1992, he was manager of Stratigraphic Sciences for Chevron Overseas Petroleum, Inc. in San Ramon, Ca. He is survived by his wife, Barbara, of Franklin, Tennessee; his son Donald III of Los Angeles; his daughter Dorothy and grandchild Kelsey in New York City; and his mother in Portland, Maine.

# Placerita Oilfield - A Case Study of Steamflooding a Complexly Stratified Reservoir

*Thomas A. Berkman*
*ARCO Western Energy*

## Background

Placerita field is located at the eastern edge of the Ventura basin in Los Angeles County, California approximately two miles from the town of Newhall. The field produces heavy oil (12° API) through cyclic steaming and steamflood injection support. Current oil production is approximately 3300 BOPD. In order to optimize steamflood recovery, ARCO has completed a detailed geological analysis and reservoir description of the main producing interval, the Pliocene lower Kraft zone. This discussion presents an overview of the field geology and addresses how completion and steam management strategies in the field were adjusted to fit the complex stratigraphy of the lower Kraft reservoir.

## Geologic Summary of Field

### Structure

A structure contour map on the top of the lower Kraft (Figure 1), shows a relatively simple structural configuration within the field. Placerita field is a gently folded homocline, striking northeast-southwest and dipping approximately 20° to the northwest. The field is bounded on two sides by faults.

The field is bounded on the north by the right-lateral San Gabriel fault, which trends N70°W in the area of the field. The north-dipping San Gabriel fault is actually a complex zone of faulting formed by multiple episodes of deformation. In the proximity of Placerita field, the most recent movement appears to be in a reverse sense. Several strands of the San Gabriel fault cut the Plio-Pleistocene upper Kraft and Saugus Formation in wells along the northern margin of the field.

The Whitney Canyon fault bounds the field on the east. This fault is interpreted as a west-dipping reverse fault. Throw along the fault ranges from approximately 150 feet in the south part of Placerita to only a few feet near its intersection with the San Gabriel Fault in the north. This fault possibly represents a leaky trap, as oil-stained cores and seeps have been noted east of the fault.

Pre-Pliocene rocks at Placerita are slightly more deformed than the Pliocene and Pleistocene section, a result of Miocene movement along the San Gabriel fault. The Placerita anticline, located in the southern part of the field (Figure 1), is a result of this deformation. This feature existed as a high during the Pliocene and consequently restricted lower Kraft deposition to the area north of the structure.

The west edge of the field is defined by a very irregular oil/water contact (Figure 1). The oil-water contact at Placerita differs by 600 feet in the space of 1 mile, from -350′ in the south, to -940′ in the north. This creates the situation that sands which are at equivalent structural levels may be productive in the north but wet in the south part of the field. Very few wells within the Placerita field penetrate the oil-water contact. The field is an edge-water drive, with a handful of wells in the southwest and northwest corners of the field drilled into the wedge zone.

## Lower Kraft Stratigraphy - Impact on Steamflooding

The oil field has reservoir characteristics that are comparable to other fields in Kern County, California, such as Midway Sunset and Kern River, where steamflooding has been extremely successful. Thermal operations work by lowering the viscosity of oil to make it mobile. The viscosity of Placerita oil can be lowered from approximately 10,000cp at a temperature of 90°F to 13cp by steam heating the reservoir to a temperature of 300°F. Steamfloods in heavy oil reservoirs are often necessary to maximize ultimate recovery.

The original geological interpretation of the field described the lower Kraft as a single sand with a few interbedded shales, ideal for steamflooding due to good reservoir continuity. The current view after continued drilling is that these sands represent independent packages which may or may not be connected at some point in the field.

Lithofacies at Placerita fall into four classes. These include: 1) pebbly to cobbly very coarse-grained sandstone and medium to very coarse-grained sandstone; 2) fine-grained sandstone to argillaceous siltstone; 3) calcareous units; and 4) shale.

The most common lithofacies and best reservoir rock in the cores in terms of visible oil-staining is the medium-grained to pebbly sandstone. Excellent exposures of lower Kraft rocks crop out approximately 1 mile south of the field in roadcuts off Sierra Highway near the Tunnel area of Newhall field, and in old roadcuts and cliff exposures east of Highway 14 via the gated Remson Street underpass.

The Sierra Highway locality contains spectacular exposures of lower Kraft large-scale channel facies in roadcuts and cliffs hundreds of feet high. Notches in the roadcuts allow a three-dimensional view of these channels.

In the subsurface, we have subdivided the Lower Kraft reservoir into 4 main sand bodies each with separate subzones (Figure 2). These sands form linear to lobate features that are up to 150 feet thick separated from each other by discontinuous shale beds. The type log shows a very complicated lower Kraft reservoir, consisting of numerous amalgamated channels, sudden facies changes, and interbedded sand-shale sequences. Also shown on the type log is the onlap of these Pliocene sands against an Eocene paleohigh (Placerita anticline) located to the south.

Although intrafield correlations are difficult, they are solvable by integrating all available geological, engineering and production data. Understanding these geologic relationships is critical to the economic success of the steamflood.

Figures 3 and 4 are representative sand and shale isochore maps of portions of the Lower Kraft (see Figure 2). "Sand 2" appears to be a linear "channel-like" feature that trends across the field from the northeast, and bifurcates into discrete subchannels also oriented roughly northeast-southwest. It is evident that individual channelized sandstone bodies in the Lower Kraft are of limited lateral extent. The "Sand 2" channel is approximately 600 feet wide in the center of the field.

Stratigraphic cross section A-A' (Figure 5) shows a series of nested channel-like features, many with abrupt lateral terminations. In the beginning stages of the project, it was difficult to envision how this reservoir would be steamflooded. Fortunately, we have been able to capitalize on our understanding of reservoir geometry in portions of the field. For example, by injecting steam into sands bodies which pinchout updip, we have built-up effective steamchests in the reservoir and enhanced gravity drainage in downdip producing wells. Wells have been recompleted in unswept zones as our understanding of the reservoir continues to improve.

The "B shale" is a representative Placerita shale body stratigraphically in the middle of the lower Kraft. Comparison of the sand and shale isochores (Figures 3 and 4) shows that the shales are less continuous than the sands. These shales record interchannel levee and overbank fine-grained deposition, which were sometimes eroded by the next channel system. Temperature logs indicate that these shales form effective seals and baffles for confining steam. In a single 5 spot steamflood pattern, it is often necessary to complete surrounding injectors in different zones to achieve flooding of all perforated zones in corresponding producers. In some injection wells, dual zone injection is used to simultaneously heat multiple zones.

## Depositional Environment

This style of deposition has been described by Lyons (1991), for nested channels and lobe facies of the Miocene Puente Formation in the Los Angeles basin, which he interpreted as forming at the shelf-edge and cut into the slope. The Lower Kraft member was deposited in middle to outer neritic water depths by rapid turbidite deposition. This interpretation is made collectively on the basis of fossil (mainly foraminiferal) data, lithology, regional geology, and stratigraphic position. Microfossils recovered from core and ditch samples from the lower Kraft zone are indicative of the "middle Pico" member of the Pico Formation of late Pliocene age (Dumont, 1990a, 1990b).

Foraminiferal checklists from Dumont were compared with published lists (Winterer and Durham, 1962) from the Pico Canyon area 7 miles to the west. The Pico Canyon section was chosen for comparison because of excellent and widely recognized exposures of "type" Pico deepwater sediments. The Pico Canyon section shows the traditional Pico faunal succession which indicates prograding up section from water depths of 2,000-3,000 feet in the lower part of the section, to a depth of 600-1,600 feet during deposition of the upper part. The shallowing-upward Pico records a regional regression in the Ventura Basin.

Although many of the forms collected at Pico Canyon by Winterer and Durham (1962) are also present at Placerita, there are significant differences. Specifically, foraminera from the lower Pico Canyon section are characteristic of water depths which are significantly deeper than the range of depths for forms at Placerita.

Lower Kraft sands at Placerita are approximately the same thickness as sands cropping out in Pico Canyon and penetrated in the Newhall Potrero subsurface. This is in contrast with the gross thickness of the Pico which decreases from nearly 5,000 feet thick in the Newhall-Potrero field (7 miles west of Placerita) to several hundred feet at Placerita. Almost all of the decrease in gross thickness of the Pico takes place in the upper part of the formation. Winterer and Durham (1962) were able to show this by tracing persistent units of conglomerate and sandstone eastward from the Newhall-Potrero oil field. They demonstrated that the contact between the Pico and the overlying beds of the Saugus occurs at lower and lower stratigraphic levels eastward beyond Pico Canyon. This implies that Pico sands at Placerita and those in Pico Canyon may be depositionally contiguous and time transgressive.

## Physiographic Setting

Pulses of coarse clastic sediment into the basin resulted from ongoing tectonism. Periods of uplift along the basin margins probably coincided with continued subsidence in deeper parts of the basin. This subsidence resulted from sediment loading, as well as structural warping and faulting along the basin edges. As the sea withdrew from the basin edge, fan deltas prograded across the exposed shelf and sourced turbidite complexes at the distal toes of the deltas. Compressional folding and reverse faulting in the east Ventura basin had initiated during the Pliocene. (Yeats et al., 1994). Pulses of movement on several faults, in particular the San Gabriel Fault at Placerita, must have caused debris to be shed into the depocenter off topographic highs.

The Lower Kraft was likely deposited in a relatively proximal position, probably abutting a fan-delta staging area (Figure 6). This complex of nested channel-fill deposits may indicate deposition seaward of a narrow shelf in an embayment at the eastern margin of the basin. Lower Kraft channelized turbidites at Placerita may represent the transport fairways for correlative sand-rich turbidites and deep-marine submarine fan deposits that make up other major hydrocarbon reservoirs further west in the basin.

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*Yeats, R.S., Huftile, G.J., and Stitt, L.T.*, 1994. Late Cenozoic Tectonics of the East Ventura Basin, Transverse Ranges, California: AAPG Bulletin, V. 78. p. 1040-1075.

## PLACERITA LOWER KRAFT TYPE LOG

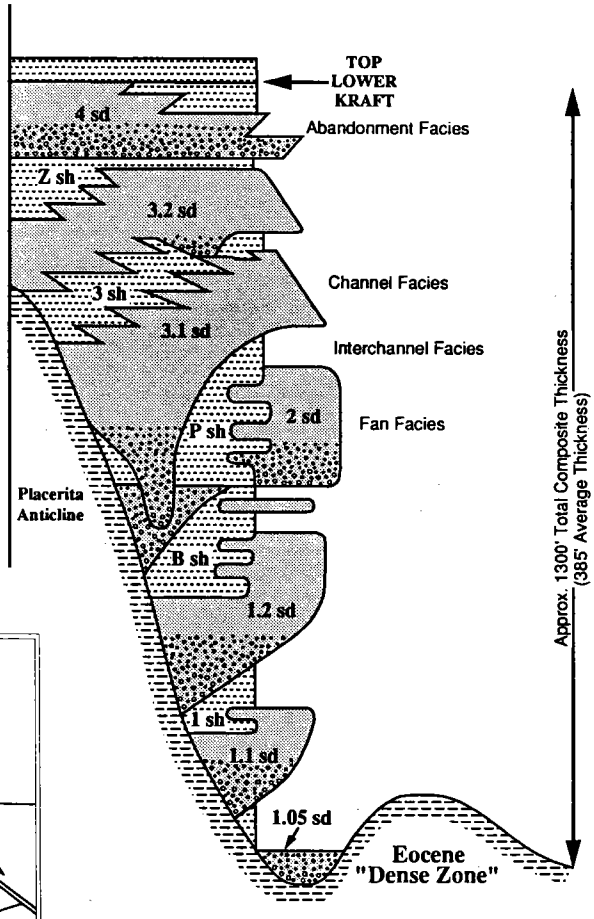
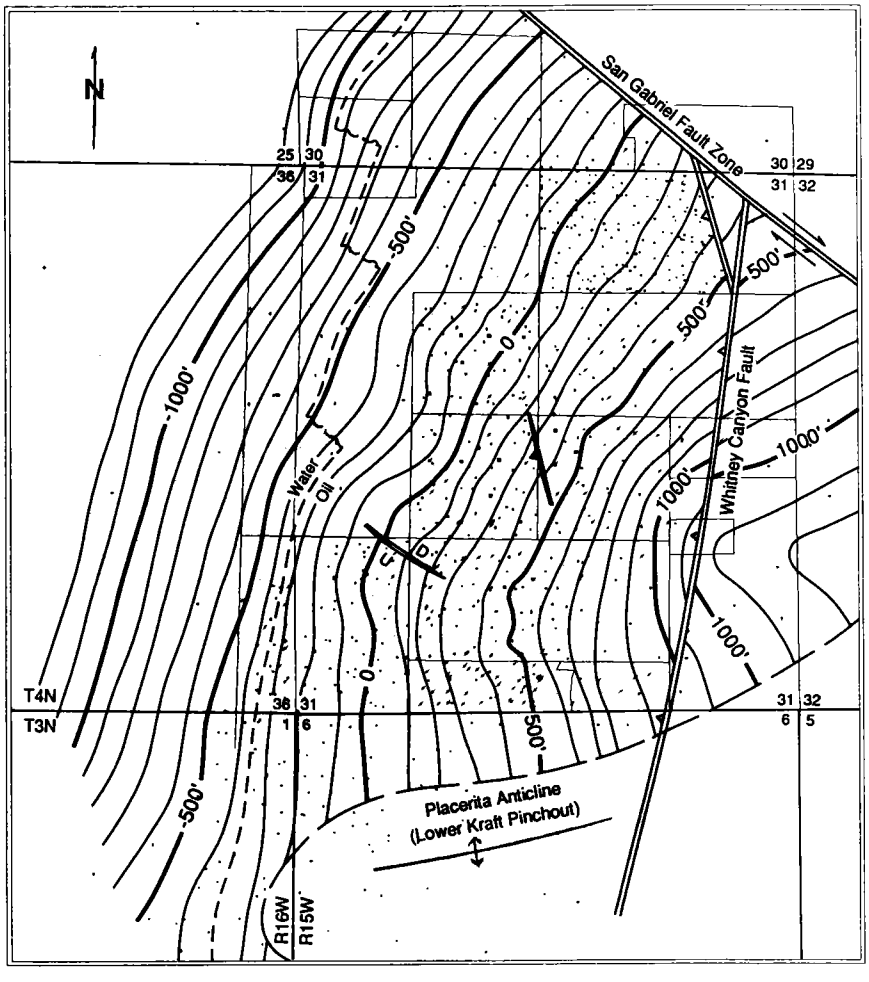



Figure 2: Lower Kraft Log




**PLACERITA FIELD**
**TOP LOWER KRAFT STRUCTURE**
C.I. - 100'
1000'

Figure 1

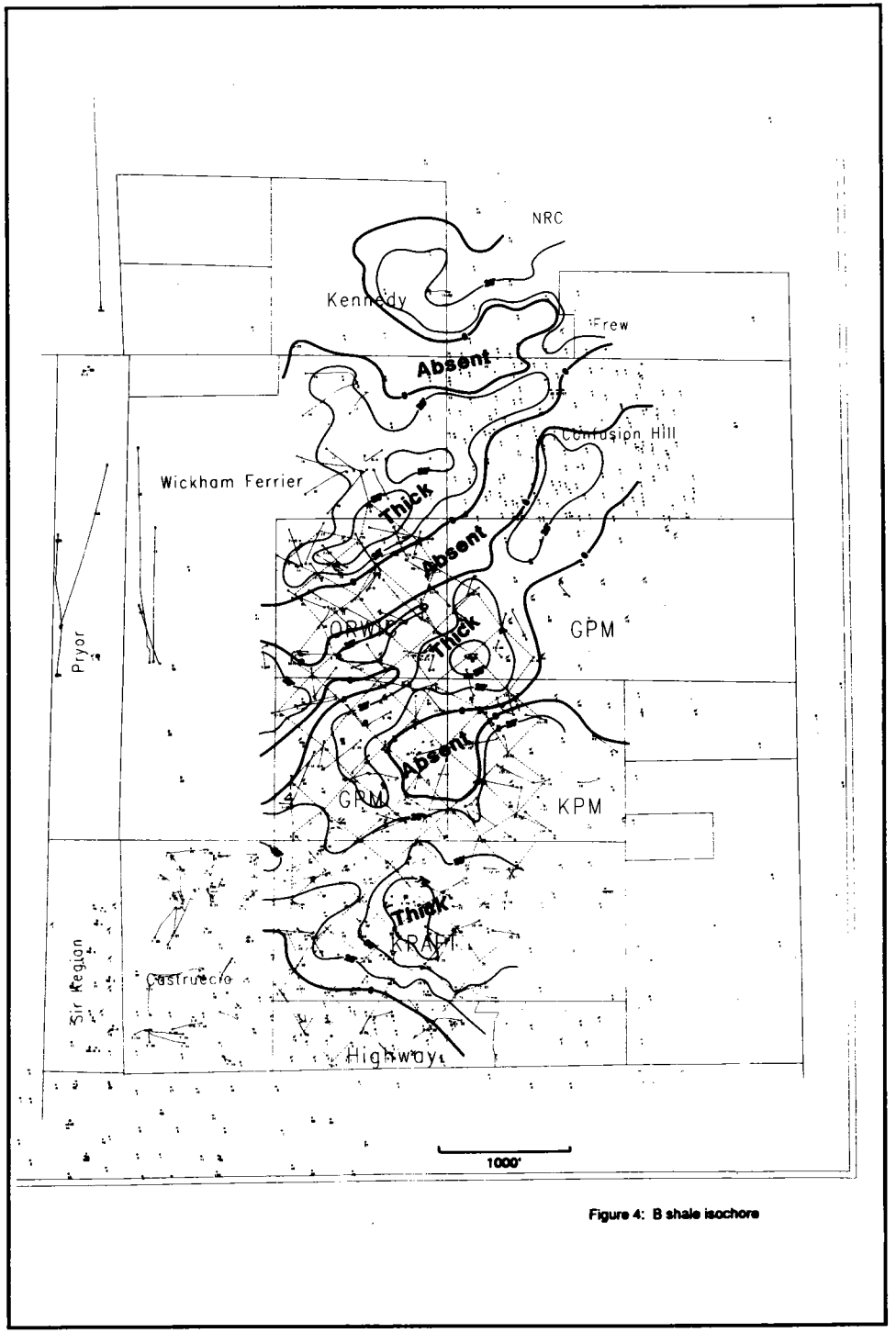



Figure 4: B shale isochore

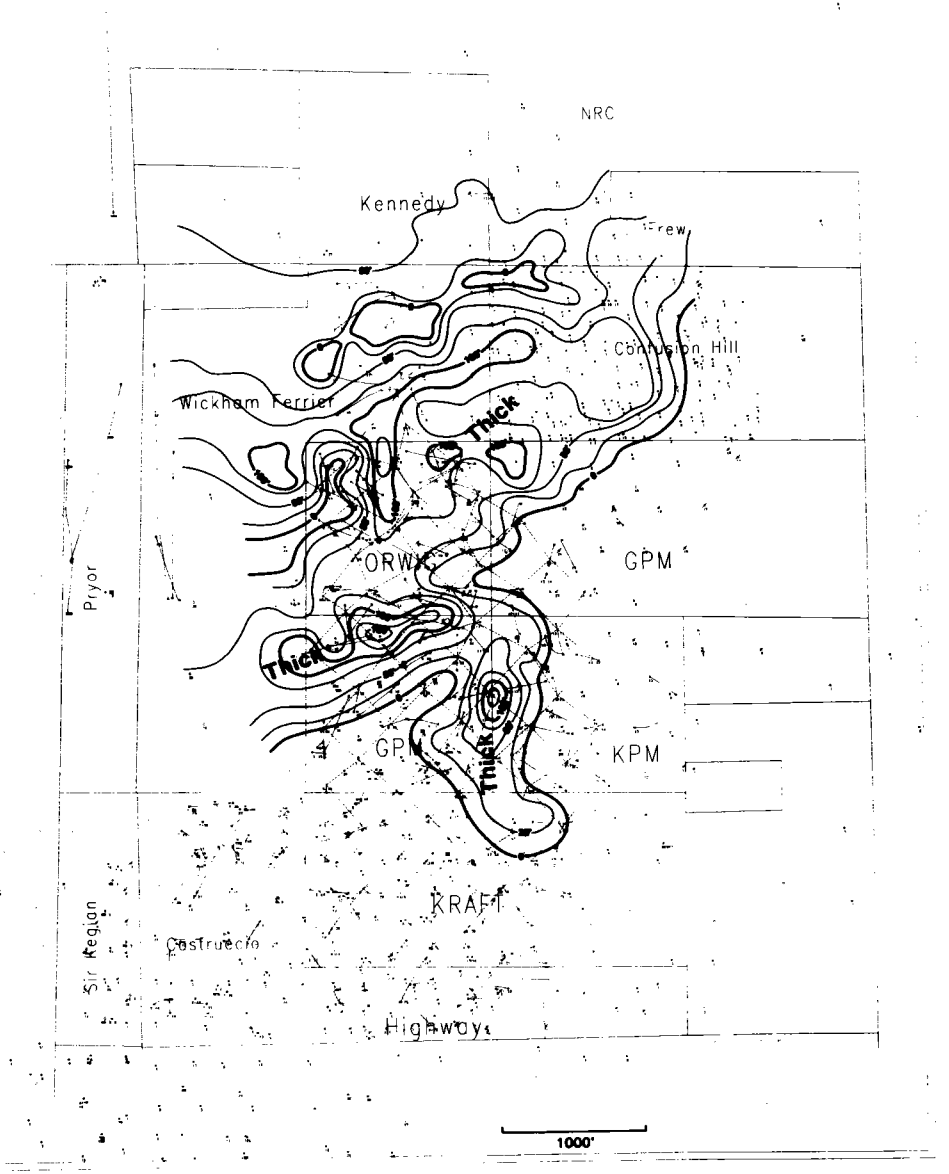



Figure 3: Sand 2 net sand isochore

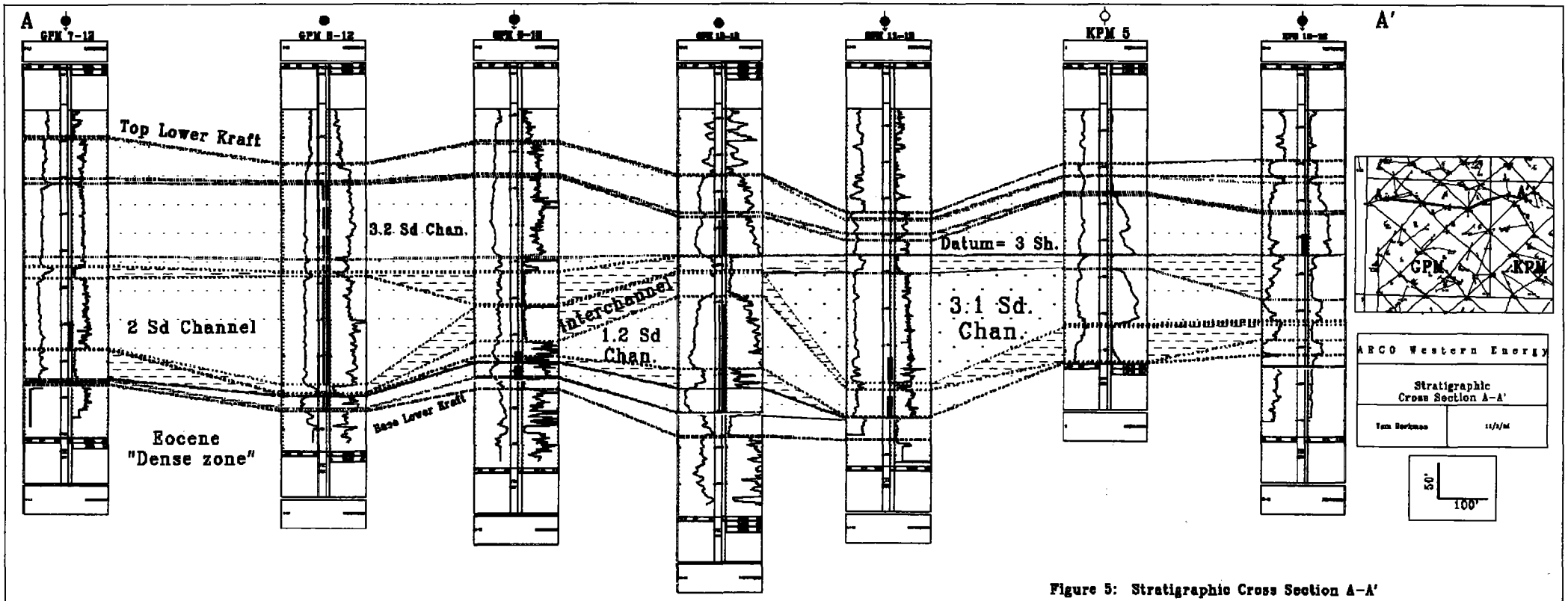
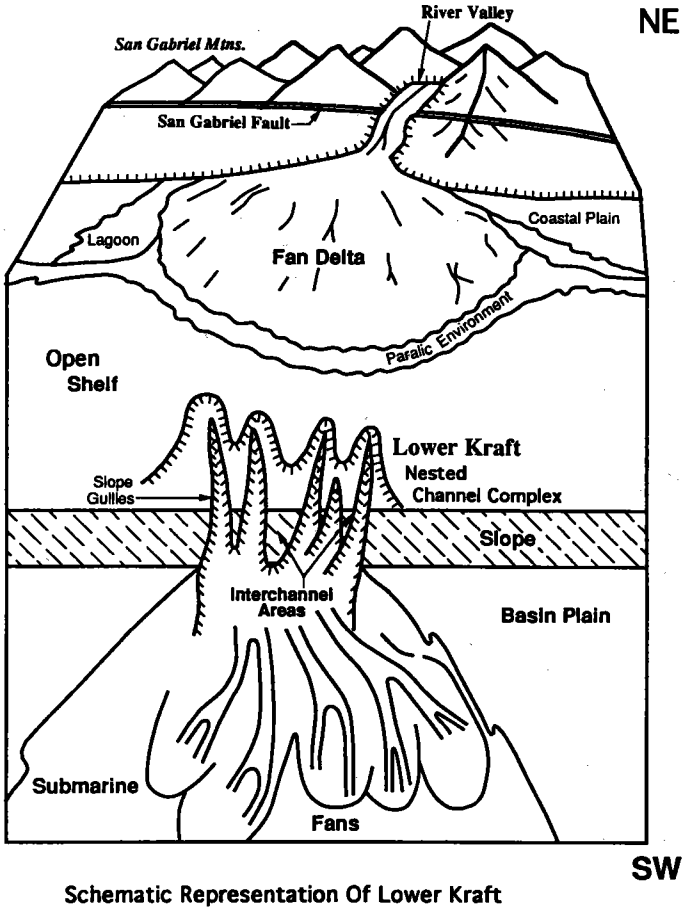



Figure 5: Stratigraphic Cross Section A-A'




Schematic Representation Of Lower Kraft Depositional Setting As Sea Gullies Incised Into Shelf Slope Break.

(No Scale Implied)
Modified From May, 1982

Figure 6

## WANTED!! EARTH SCIENTISTS/ENGINEERS

San Joaquin Valley SCIENCE HOTLINE - Science from Grades K - 12. Do you have 1-2 hours, 1-2 times per year that you could be a guest speaker at a school or an advisor for a Science Fair project? Your experience can help teachers upgrade their science curricula. You can help show kids the roles of science in today's society. SJV AAPG is setting up a phone list of Earth Scientists/Engineers that would be willing to visit 1-2 classrooms per year as guest lecturers on Earth Science subjects. A wide range of topics need support: chemistry, physics, geology, environmental sciences and oceanography. Workshops to provide presentation tips may be provided if needed.

This program is within the scope of the AAPG Youth Activities Committee. We will work through the Kern County Superintendent of Schools to notify science teachers and to coordinate the program. If you are interested call Paul Henshaw at (805) 395-6436 [W] or (805) 663-0449 [H] or Tony Reid at (805) 763-6323.

## COLORADO NEWS

As you probably heard, Sue and Glenn Kiser packed up the family and headed to God's country, Colorado, last August. Well, they didn't travel too far. They unloaded their belongings and staked their claim in Grand Junction, Colorado, a small community just 25 miles east of the Utah border with a population of 34,000. They located a house tucked between the Colorado River (a quarter mile from their house) and the Colorado National Monument, and quickly settled within the community.

Sue has opened a branch office of WZI, Inc. With the valley currently in attainment, Sue expects to have plenty of future work in the area of environmental permitting, water studies, site assessments and of course, any petroleum work that's available. Her address is WZI, Inc., 2501 Blichman, Suite 115, Grand Junction, Colorado 81505, telephone (303) 241-1404. Daughter, Audrey, loves the high school and son, Everett, found bicycles were the preferred mode of transportation of his schoolmates (no bike lock required). Winter skiing is 30 minutes from their door. Glenn is enjoying his yearlong hiatus exploring the beautiful area and its many lakes. Last month he landed a 17" rainbow trout on the Gunnison River. With job opportunities plentiful, Glenn's hiatus just might be cut short.

Stay tuned for future updates on the Kiser adventure.



## IN MEMORIUM
## TENNANT BROOKS

"Tennant will be fondly remembered for his profound knowledge and expertise in geology, fishing, scouting, music, archery hunting, Indian lore and gardening," Dan Nolan said of his longtime friend and fellow geologist, Tennant Brooks, 82, who died August 25 in Sacramento.

Nolan, retired from Santa Fe Energy Resources, is one of the many members of the oil and gas exploration and development fraternity numbered among Brooks' friends.

Another is Rufus Cook, retired geologist, who spent the larger part of his more than 40 years in the oil patch with Standard Oil Co. of California, now Chevron. The two met while working at Elk Hills in the late 1940's and early 1950's.

"Tennant liked to go fishing," Cook recalled of day-long trips to streams on the western slope of the Sierra. "When he went fishing, he took strawberries and fresh cream in an ice chest and brought a stool he'd sit on while he ate strawberries and cream between catches."

Born in San Diego, Brooks spent his early years on a farm near Sacramento before enrolling at UCLA. By the time he finished his master's program in geology in the depression-ridden 1930s, his resume included a variety of jobs, ranging from fighting forest fires to working as a roustabout in San Joaquin Valley oil fields.

His first employment as a geologist was with Union Oil Co. of California. When World War II intervened, he enlisted in the Navy, serving as an officer in the Pacific Theater. After the war ended, he returned to Bakersfield and soon became district geologist for Standard of California's Elk Hills operations.

In the years that followed, his assignments for Standard and later with Ferguson & Bosworth and as a consultant took him to many parts of California, the Great Lakes area, the Rocky Mountains and Thailand, among other places. In California, he was especially noted for his work on the east side of the San Joaquin Valley.

His fascination with the oil and gas industry led to active memberships in related societies, including the San Joaquin Geological Society, which he served as president; the American Association of Petroleum Geologists; and various Paleontological Societies. He authored numerous scientific papers.

A secondary interest was teaching. He spent several years on part time staff work at Bakersfield College in geologic studies.

In later years, he was a staunch exponent of petroleum industry causes, giving speeches and interfacing with politicians on conservation and petroleum points of view in Washington, D.C., Sacramento and San Diego.

"For those of us close to him, he was admired for his honesty and concern for the world he abundantly enlightened," Nolan said.

An enduring memory of Tennant Brooks will be of the artifacts he brought back from Thailand in the 1950s. He exhibited them at the Beale Library in Bakersfield and offered descriptive lectures to school children and other interested persons. It was a part of the generous sharing with others that characterized his life.

*— Bill Rintoul*

## SENTEUR DE BOUE

Jean O. Senteur De Boue, semi-self-employed earth scientist, was recently honored by an appointment of professor emeritus at a major southern California university. Professor Senteur De Boue, a long-time honored member of the Pacific Section, is currently investigating the healing effects of various minerals in his extensive collection of crystalline borate minerals. He will also soon publish his long-time work on the astroidal impact origin of the southernmost San Joaquin Valley, an extremely deep circular basin associated with fractured basement production along the basin margin.

*To honor Mr. Dibblee and to raise map production capital, the **Dibblee Medal** was conceived and the first medal was awarded in 1994 to Dr. Lehi F. Hintze, of Provo, Utah, for his outstanding efforts in mapping and publishing the geology of Utah. Nominations are now being accepted for the award of the second **Dibblee Medal**.*

## *DIBBLEE MEDAL GEOLOGIC MAPPING NOMINATIONS INVITED*

The Thomas Wilson Dibblee, Jr. Geological Foundation (Dibblee Geological Foundation) has established the **Dibblee Medal** in recognition of the unique contributions of Tom Dibblee to the science of geologic mapping. The medal is to be awarded at least biennially to a geologist whose published geologic mapping is exceptionally noteworthy.

The award consists of an attractive sterling silver medal bearing the likeness of Tom Dibblee; and on the obverse side, a sketch map of California, the geology of which has been Tom's domain for 60 years. A plaque suitable for wall hanging will accompany the medal.

Nominations of candidates to be considered for the second award of the Dibblee Medal are now being solicited. Nomination should include the name of the candidate, biographical data, a description of the geologic mapping, and the names of at least two geologists who support the nomination. Mail each nomination and supporting data by March 1, 1995 to:

Dibblee Geological Foundation
P.O. Box 60560
Santa Barbara, CA 93160

The second **Dibblee Medal** will be awarded at the meeting of the Pacific Section of AAPG in May 1995, in San Francisco, CA.

The Dibblee Foundation is a nonprofit corporation chartered in California in 1983 for the purpose of publishing Tom Dibblee's geologic mapping. To date, the Foundation has published 47 maps covering sixty-five 7-1/2 minute quadrangles, with several hundred more awaiting publication.

# HYDROGEOLOGY REGULATION UPDATE

## President's Notes

I am pleased and proud to announce that the regulation protecting the hydrogeologist title has become law in the State of California. We now have a program in place which will accurately evaluate whether a professional person who uses the specialty title of hydrogeologist is properly educated, trained and qualified.

As you may know, the finalization of this specialty regulation has been under development for many years. The Geology Board, the staff and the Board's Professional Affairs Committee have labored long and hard to bring this regulation to its final form.

The new regulation is a logical response to the growing importance and proportion of groundwater in the overall mix of domestic and agricultural water supplies in California. As a result, the importance of maintaining a pool of trained, tested professionals who understand the dynamics of groundwater quality and quantity continues to grow. We only have to look at the controversy surrounding the development of a low-level nuclear waste dump at Ward Valley in the Mojave Desert to understand the importance of maintaining a well education and well trained cadre of hydrogeologists to help protect public health standards in California. I am confident that the establishment of this specialty regulation, under the auspices of the Geologist and Geophysicist Act, will insure that the title of hydrogeologist will be enhanced and protected throughout the State.

Many thanks are in order for this accomplishment, and I personally wish to offer my thanks and appreciation to Mr. Howard "Buzz" Spellman, former Board President, Mr. Frank Kresse, Chairman of the Board's Professional Affairs Committee, Mr. Gary Duke, Board Legal counsel and Mr. John Parrish, former Board Executive Officer for their many extraordinary efforts in making this important new regulation a reality.

**Art Letter**
*President, Board of Registration for Geologists and Geophysicists*

The Hydrogeology Regulation has been in development since 1986, a response to growing public awareness of the importance of groundwater development and regulation. In fact the public, including the legislature recognized that a growing portion of Environmental Impact Reports dealt with groundwater and that the sections dealing with ground water were of such generally poor quality, that the public was not well served by an ill-defined group of professionals calling themselves "hydrogeologists".

The Board of Registration for Geologists and Geophysicists took on the task of defining "hydrogeology" and the following definition is the result of many hearings and discussions:

> *"Hydrogeology means the application of the science of geology to the study of the occurrence, distribution, quality and movement of water below the surface of the earth, as it relates to the interrelationships of geologic materials and processes with water, with particular emphasis given to groundwater quality."*

A convenient example likens the specialty of hydrogeology to the specialty of engineering geology currently regulated by the California Board. In this case, all approved applicants must pass a hydrogeology examination without any grandfathering. The following section has been added to the California Code of Regulations:

***Section 30-42. Specialty in Hydrogeology***

(a) A specialty in "hydrogeolgoy" is hereby created as a division of the certification of registration as a geologists. The creation of the certification in hydrogeology is established to protect the health, safety and welfare of the people of California.

(b) In addition to the provision of Section 7842 of the Code an applicant for certification in the specialty of "hydrogeology" shall comply with the following:

1. Be registered as a geologist in the State of California.
2. Have a knowledge of and experience in:
   A. Geology of the State of California
   B. Geologic factors relating to the water resources of this State.
   C. Principles of groundwater hydraulics and groundwater quality including the vadose zone.
   D. Applicable federal, state and local rules and regulations.
   E. Principles of water well, monitoring well, disposal well, and injection well construction.
   F. Elementary soil and rock mechanics in relation to groundwater, including the description of rock and soil samples from wells.
   G. Interpretation of borehole logs as they relate to porosity, permeability or fluid character.

(c) An applicant for certification as a hydrogeologist shall submit, with his or her application, three (3) references from either registered hydrogeologists or registered geologists (they must include their registration number in their reference materials to be valid) who have a minimum of five years' experience in responsible charge of hydrogeological work. An applicant may also be required to submit one or more hydrogeology reports which were prepared by him or her or which he or she was closely associated with during its preparation.

(d) A civil engineer registered to practice civil engineering in this state, under Chapter 7 (commencing with Section 6700) of Division 3 of the Business and Professions Code, insofar as he or she practices civil engineering is exempt from the provisions for certification as a hydrogeologist.

The Board is aware that conflicts may arise with practitioners of hydrogeology who have historical experience in the field but are not yet licensed as well as with other professional groups such as Engineering Geologists or Soil Scientists as the measure unfolds. We will be working closely with these and other groups to ensure a smooth transition to the new regulations and testing procedures.

The first examination is planned as a four house exercise, similar to the Certified Engineering Geology Examination. The examination is scheduled to be given for the first time in March of 1995 in conjunction with the regular registration and specialty examinations administered by the Board.

**For more information contact:**
**Dalton Pollard, Executive Officer or**
**Denise Pellerin, Office Manager**
**Board of Geology and Geophysics**
**400 R Street, Suite 4060**
**Sacramento, CA 95814**
**Tel (916) 445-1920**
**Fax (916) 4445-8859**

## ELECTION OF BOARD OFFICERS

New officers were elected at the September 26, 1994 Board meeting. Mr. Robert Lindblom was elected President and Ms. Seena Hoose, Vice-President.

**Robert Lindblom**, the Board's petroleum geologists member was appointed by Governor Pete Wilson in July 1992. Mr. Lindblom received his bachelor's degree in geology from the University of Chicago in 1950. He retired from Chevron, USA in 1990 after 35 years of service. Mr. Lindblom is a petroleum consultant in Menlo Park and has been a lecturer at Stanford University's petroleum engineering department since 1975, and a consulting professor there since 1985.

**Seena N. Hoose**, of Cupertino was appointed as the professional geologist member of the Board by Governor Wilson in September 1993. Ms. Hoose received a Bachelor of Arts degree in geology from the University of California, Santa Barbara in 1963. She earned a Master's degree in geology/engineering geology from San Jose State University in 1986. Since 1989, she has been an engineering geologist for the Santa Clara Valley Water District. Previously, Ms. Hoose was an associate engineering geologist from 1986 to 1989 for the Regional Water Quality Control Board and was a geologist for the U.S. Geological Survey from 1971 to 1986.

## APPOINTMENT OF NEW BOARD MEMBER

After more than two years, we now have a full complement of eight Board members. Governor Wilson has appointed Mr. John Barna, Director of College Relations of Harvey Mudd College, Claremont, CA to the Board, We welcome him aboard.

## NEW EXECUTIVE OFFICER

**Dalton Pollard** was appointed as the new Executive Officer by the Board at the August 26, 1994 meeting, taking office on September 1.

Mr. Pollard received a Bachelor of Science degree from Stanford University in 1956 and a Master of Arts degree from U.C.L.A. in 1958, both in geology. He worked as a subsurface petroleum geologist for Texaco in Canada from 1958 to 1962 and Dow Chemical in California from 1962 to 1964. He has been a consulting geologist since 1964, except for three years, 1980 to 1983, during which he was the exploration manager and president of a small oil company, managing its exploration and production activities in California and the Mid-Continent and Gulf Coast areas.

**John Parrish** resigned on June 30, 1994 as Executive Officer of the Board to take a similar position with the Division of Mines and Geology. His contributions to our Board were significant and we wish him success.

**Michael Moore** was appointed as Interim Executive Officer and served us well during July and August, making important changes in office procedures.

## RECENT EXAMINATION PARTICIPATION

A combined total of 751 people took the September 1994 examinations, 359 in Sacramento and 392 in Riverside. The breakdown is as follows:

| | Sacramento | Riverside | Total |
|---|---|---|---|
| Geology | 264 | 287 | 551 |
| Geophysics | 5 | 4 | 9 |
| Eng. Geology | 90 | 101 | 191 |
| | **359** | **392** | **751** |

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## MAMMOTH LAKES RESEARCH WELL

A geothermal research well three and one-half miles northeast of Mammoth Lakes in the High Sierra sat out last summer while awaiting the funding to continue a probe to evaluate molten subsurface rock as a high quality, clean energy alternative to fossil fuels.

Sandia National Laboratories' Long Valley Federal No. 51-20 remains idle as Nabors Drilling USA Inc's Rig No, 202 out of Bakersfield quietly begins its sixth year on location. The powerful rig is rated for drilling to depths of 35,000 feet.

The Mammoth Lakes research well was spudded on August 2, 1989. During the first summer drilling season, the well was drilled to a depth of 2,568 feet. No additional drilling was undertaken in the summer of 1990, which was devoted to scientific investigations.

During the second drilling season in the summer of 1991, the well was taken to 7,588 feet, with the bottom portion consisting of a diamond-drilled corehole.

The 1992 season involved more scientific investigations without additional drilling. A major item consisted of four mini hydrofracs of approximately 3 foot intervals in the overall interval from 7,200 to 7,400 feet in the corehole.

Following fracing, a televiewer run on wireline mapped fractures in the two upper intervals. As the instrument was run, a graphic continuous printout was available at the surface, enabling viewers to identify obvious fractures. The research was aimed at offering a better understanding of the mechanics of earthquakes as well as providing information that could be important in the design of any type of geothermal power plant.

The 1993 summer work involved a pair of measurement-while-drilling experiments as well as casing repair in which 1,500 feet of 13-3/8 inch casing was run as a tie-back string for casing cemented at 6,825 feet.

One of the MWD experiments involved testing the durability of disposable fiber optic cable. Use of such cable could open the way for obtaining more data during drilling operations.

A second experiment involved bottom hole acoustics, consisting of shooting charges downhole and measuring the acoustic waves that came up the drill string. Data transmitted acoustically up the drill string while drilling could be helpful in directional drilling, evaluation of drilling performance and possibly as the first signal of a kick.

Last summer, the project was on hold, awaiting funding to go into the third drilling phase. The phase calls for taking the well to 14,000 feet. A fourth and final phase would take the hole to 20,000 feet or until a temperature of 932° Fahrenheit is reached, whichever comes first.

The Long Valley caldera that is the site of the well was chosen as the best of 22 U.S. sites evaluated by a multidisciplinary team of Sandia scientists because a magma chamber is believed to lie only about 4 miles beneath the surface.

Though not scheduled to drill into magma, the research well, designed and managed by sandia, could be expected to answer fundamental questions about the existence of magma at drillable depths and the ability of geophysical techniques to accurately locate magma bodies.

While commercial power generation from magma might be two to three or more decades away, it is believed information gained from the Mammoth well, if taken as deep as planned, could set the stage for drilling into magma and inserting a heat exchanger to use the molten rock to heat a liquid. The hot liquid then could be pumped to the surface, where the heat could be used for industrial processes or to generate electricity.

The U.S. Geological Survey has estimated that magma less than 6 miles deep beneath the continental United States contains up to 500,000 quads of energy. One quad — a quadrillion British thermal units — is the energy equivalent of 172 million barrels of oil.

*— Bill Rintoul*

## *DELEGATES CORNER*

How are the local geological societies, the Pacific Section AAPG, and the National AAPG related? And why, if I'm a member of the National AAPG, don't I get the Pacific Sections Newsletter or the local societies mailings? These are probably the two most common questions asked of me and many other delegates or society officers. Most people think the relationship is purely hierarchical; that is local societies (such as San Joaquin, Coast, Sacramento, etc.) "report" to a Regional Society (Pacific Section) which in turn "reports" to the National AAPG. While in some ways this is true, in reality the relationship is more like that of a triangle with the local societies, the PS-AAPG and National AAPG each located at a corner. Unique lines of communication and responsibilities connect each society to the others and membership in one does not necessarily ensure membership in the others. Today's column briefly describes how the local society is functionally related to PS-AAPG and to the National AAPG. In a future issue of the PPG, I'll discuss the role of PS-AAPG and the membership relationships between the various societies.

At the local society corner of the above triangle, two groups of elected officials represent the local societies interest. First are your elected local society officers who, in addition to fulfilling their operational duties for the local society, also send one representative (usually the president or president-elect) to serve on the Pacific Section Executive Board. Roughly half of the voting members on the PS-AAPG Executive Committee are local society representatives. The Executive Committee meets every two months and the local representatives participate in organizing and running the Pacific Section activities (including short courses, the annual convention, etc.), bring new ideas and fresh perspectives from each local societies viewpoint, and work to keep the PS-AAPG relevant and responsive to the changing needs of the local societies.

*(Continued from page 14)*

The second group of elected local society officials is their delegate contingent to the National AAPG's House of Delegates, the "legislative body" of the National AAPG. Delegates are elected by the local societies on the basis of 1 delegate for every 70 National AAPG members residing in the local society. Currently the House of Delegates has 251 members of which 13 are from the Pacific Section. These delegates provide a direct link between the local societies and the National AAPG. There is no direct link or relationship between the delegates and the Pacific Section AAPG. The delegates assist the National AAPG by reviewing local applications for AAPG membership and meet locally as often as needed. They also meet annually at the National Convention where they review and vote upon issues brought to them by the National AAPG's Executive Committee. Delegates also may serve on a number of the committees that, in turn, propose measures and bring issues to the Executive Committee of the National AAPG. Although the National AAPG does an excellent job of communication through their Explorer Newsletter, the delegates serve as another source of information connecting the National AAPG to the local societies.

In a future issue: the PS-AAPG and membership relationships

*— Robert L. Countryman*
*SJGS Delegate*

# *ECOLOGY FIELD TRIPS*

Sponsored by
Bureau of Land Management

The Bureau of Land Management has initiated a program of monthly earth science field trips to points of ecologic, geologic, paleontologic and historic interest throughout central California. These trips are designed for persons of high school age or older. It is **not** necessary to have a technical background to attend or benefit from the trips.

These field trips are recommended for teachers and many of them can be taken for in-service continuing education credit through California State University Bakersfield. Each trip includes a full spectrum of environmental and land management topics. The field trips are conducted using buses or vans. Private vehicles are not used except in special circumstances. A field guide is prepared for each trip which includes maps and directions which can be used by anyone for self-guided investigation of the ecology along the field trip route.

To register for trips, call Dr. Gregg Wilkerson at (805) 391-6081

## 1994–95 SCHEDULE

**Ecology of the Westside San Joaquin Valley: Sat., Dec. 10, 1994**
The ecology and geology of Wheeler Ridge, White Wolf Fault, Maricopa and McKittrick Brea Pits, Oil Mining (diatomite), Lake View Gusher, Elk Hills Naval Petroleum Reserve and South Belridge oilfield are discussed. Includes a display of core at the West Kern Oil Museum.

**San Andreas Fault: Gorman to Wallace Creek: Sat., Jan. 7, 1995**
This trip examines the "Big Bend" segment of the San Andreas Fault. Exposures of the 1857 Ft. Tejon fault scarp are inspected along with several pressure ridges and sag ponds. The timing of earthquake activity along this stretch of the San Andreas is discussed in relation to the offset drainage at Wallace Creek. We also learn about ongoing efforts to enlarge the Carrizo Plains Natural Area and Wildlife Reserve.

**San Andreas Fault: Coalinga to Pinnacles: Sat., Feb. 4, 1995**
The Coalinga Sulfur Springs, San Andreas Fault and Pinnacles National Monument are the main stops on this trip. The history of earthquake activity including the Coalinga and Parkfield earthquakes are discussed.

Registration for field trips is $20.00 per adult or $40.00 per family. Children under 16 are $10.00. For persons taking their own vehicles, registration is $20.00 per person or $40.00 per vehicle. If you have any questions about this program call Dr. Wilkerson at 805-391-6081 or write to MOTHER LODE c/o Gregg Wilkerson, 7005 Hooper Ave., Bakersfield, CA 93308.

## Association for Women Geoscientists

Information about the AWG Chrysalis Scholarships may be obtained by writing to:

CHRYSALIS SCHOLARSHIPS — ASSOCIATION FOR WOMEN GEOSCIENTISTS
c/o G & H Production Company
518 17th Street #930
Denver, CO 80202

Donations for this unique support for deserving geoscience students will be welcomed by the AWG Foundation at the same address.

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