



PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

of the Pacific Section
American Association of Petroleum Geologists

FEBRUARY/MARCH 1986 NO. 2

CONVENTION ELECTION ISSUE

IN MEMORIAM Albert G. Hluza 1925 - 1985

Friendliness, courteous treatment of all those with whom he came in contact and, above all, a desire to be helpful were the qualities by which Al Hluza will be remembered.

As a 30-year employee of the Division of Oil & Gas, most recently as deputy supervisor of the Bakersfield district, Al probably knew as many people in the oil patch as anyone around, and those he didn't meet through business he probably encountered through such industry associations as the San Joaquin Geological Society, the Society of Petroleum Engineers, Petroleum Production Pioneers and the San Joaquin Valley Chapter of the American Petroleum Institute, which he had ably served as chairman.

A friend to all, Al was known affectionately by those who held office in the API chapter as the final authority on what the chapter's constitution permits and what it doesn't permit. He was long associated with the chapter's scholarship program, taking pride in the awarding of scholarships — totaling \$10,000 last year alone — to deserving students so they might further their education in studies related to the petroleum industry.

Born November 3, 1925 in Damon, Texas, Al was a 1950 graduate of Texas A & M with a bachelor of science degree in geological engineering. His survivors include his wife, Catherine; son and daughter-in-law, Bill and Cyndee; daughter, Linda, all of Bakersfield; mother, Elizabeth Hluza of Damon; brothers and sisters-in-law, Lawrence and Teresa Hluza of West Columbia, Texas, and Rueben and Marylee Hluza of Rosenberg, Texas; mother-in-law, Catherine Kelly of Taft; brother-in-law, Jim Kelly of Bakersfield; future son-in-law, Mark Reimer of Bakersfield; and a host of friends who cherish their memories of a fine man.

Bill Rintoul

MORE POSTING REDUCTIONS FOR WEST COAST CRUDES

In the October-November, 1985 issue, this publication reported a significant drop in posted prices for local crudes, following a worldwide trend. Last autumn's declining prices were a gentle downward drift compared to the precipitous fall since January. Now the futures price of West Texas crude is reported daily on the news as energy prices again become of great interest to the public.

West Coast crudes have also been strongly affected by recent events. A sampling of current postings as of March 11, 1986 from Unocal, is:

FIELD	Base Gravity Degrees API	Aug. 1 Price per Barrel	March 1 Price per Barrel	Percent Change
Belridge	14.0	\$20.50	\$11.40	-44
Casmalia	9.4	16.90	7.90	-53
Cat Canyon	11.0	17.35	8.35	-60
Coalinga	15.0	20.85	11.60	-44
Gato Ridge Area	13.0	17.95	8.65	-52
Huntington Beach	20.0	21.30	13.00	-39
Kern River	13.0	20.25	11.25	-44
Long Beach (Sig. Hill)	29.0	23.90	14.15	-41
McKittrick	12.0	20.10	11.10	-45
Midway-Sunset	13.0	20.30	11.30	-45
Santa Maria Valley	15.0	18.65	9.25	-44
Simi	19.0	21.60	12.30	-43
Wilmington	17.0	21.75	12.45	-43

As might be expected, the lower-quality oils suffered the greatest percent declines in price.

Anyone with any pretense to knowledge can be heard quoted in the media now saying prices will rise, fall or stabilize. No one really knows, but we will all follow market developments with close attention.

Seismic Interpretation for Detailed Exploration, Production, and Development

CONTINUING EDUCATION

SEG

Special presentation for the Bakersfield '86
AAPG, SEPM, & SEG Pacific Section
61st Annual Meeting

Errata:

In the December 1985/January 1986 issue the Pacific Section Treasurer was given as the individual to whom donations for the Kevin Hurst Education Fund, should be sent. This is *not* the case, these donations should go to: Don Padick, P.O. Box 484, Simi, CA 93065.

CANDIDATES FOR OFFICE — PACIFIC SECTION AAPG



DAN E. PASQUINI

Candidate for President-Elect

Present Position:

Vice President — Argo Petroleum Corp.,
Ventura

Education:

Pacific Western University, B.S.

Employment:

1968-80: Occidental Petroleum Co.,
Bakersfield, California. Exploration
Geologist

1980-80: ARGO Petroleum Corp., Ven-
tura, "California." Senior Exploration
Geologist

1981-85: ARGO Petroleum Corp., Western
Div. Exploration Manager

Professional Activities:

Pacific Section AAPG Sect.

1980: Pacific Section AAPG Annual Con-
vention Registration Chairman

1978-79: San Joaquin Geological Society
Treasurer

Education:

1952, Ohio State University, B.S.

Employment:

1950: Rowan Drilling, Roughneck, West
Texas

1950-52: Geochemical Eng. Co., Mudlog-
ger - Manager, Midland

1953-Present: Union Oil Company of
California, in Midland, Anchorage and
Ventura

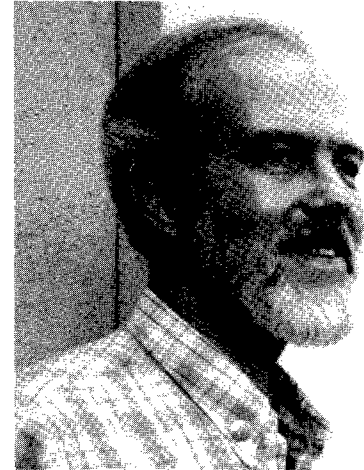
Professional Activities:

Member, AAPG, Pacific Section AAPG
and SEPM, Coast Geological Society,
and Ventura Well Logging Society

1973-74: Treasurer, San Joaquin
Geological Society

1972-75: Continuing Education Chairman,
SJGS

1975-76: Secretary, Pacific Section AAPG
and Continuing Education Committee
Member, AAPG



JACK H. WEST

Candidate for Vice President

Present Position:

Exploration Manager, West Coast Region,
Cities Service Oil and Gas Corp.,
Bakersfield

Education:

1957, University of Oregon, B.S.

1961, University of Oregon, M.S.

Employment:

1961-78: Texaco, Los Angeles and
Bakersfield

1978-83: Occidental Petroleum,
Bakersfield

1983-Present: Cities Service, Bakersfield

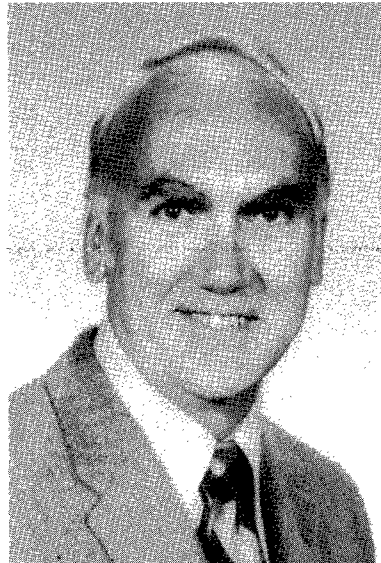
Professional Activities:

Past president and vice president, San Joa-
quin Geological Society

Member, AAPG

Member, SPE

San Joaquin Well Logging Society



ROBERT A. NESBIT

Candidate for Vice President

Present Position:

Consultant - Oil scout, Bakersfield

Education:

1947, Stanford University

1951, Oregon State, M.S.

Employment:

1947-49: Superior Oil Co., Colombia and
Venezuela

1952-56: Texaco, Santa Paula: MJM & M
Oil Co., Ventura

1956-83: Western Gulf Oil Co., West
Texas and California and Alaska

1983-Present: Consultant, Bakersfield

Professional Activities:

1961: President, SJGS

1977-78: Delegate for San Joaquin District
to national AAPG

1980: Vice-chairman, Pacific Section An-
nual Meeting in Bakersfield
San Joaquin Well Logging Society

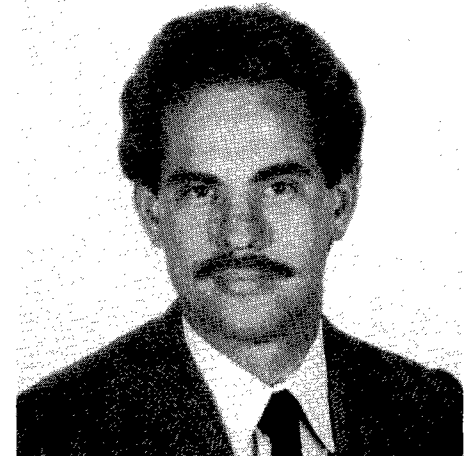


DON WM. REYNOLDS

Candidate for President-Elect

Present Position:

District Development Geologist, Northern
California District, UNOCAL, Ven-
tura



SCOTT E. THORNTON

Candidate for Secretary

Present Position:

Geologist — UNOCAL International,
(Latin America), Los Angeles

Education:

1973, University of Wisconsin, B.A.,
Geology

1976, Duke University, M.S., Geology and Geophysics
 1981, University of Southern California, Ph.D., Geology

Employment:

1975: Summer, Geologist, Shell Oil Co., Houston
 1976: Summer, Geologist, Shell Oil Co., International Ventures, Houston
 1981-85: Exploration Geologist, Shell Oil Co., Pacific Frontier Division (California — N. Alaska), Houston
 1985-Present: UNOCAI International, Los Angeles

Professional Activities:

1985: Nominating Committee, S.E.P.M.; Field Trip Committee L.A. Basin Geological Society
 1985-1988: House of Delegates



**BONNIE
 BLOESER-COOPER**

Candidate for Secretary

Present Position:

Advanced Exploration Geologist —
 Texaco USA, Los Angeles

Education:

1972, L, Universite de l'Ouest, Angels, France
 1974, UCLA, B.A., Geomorphology
 1978, UCLA, M.S., Dept. of Earth and Space Science

Employment:

1978-79: Texaco USA, Geologist I
 1979-80: Texaco USA, Geologist II
 1980-81: Texaco USA, Petroleum Geologist
 1981-84: Texaco USA, Exploration Geologist
 1984-Present: Advanced Exploration Geologist; Lead Geologist, offshore Alaska, Beauford and Chuckchi Seas

Professional Activities:

1983-Present: AAPG, Distinguished Lectures and Publications Committee
 1983-Present: AAPG House of Delegates
 1982-84: L.A. Basin Geological Society, President
 1981-82: L.A. Basin Geological Society, Vice President

CONVENTION ACTIVITIES**Opening Session**

Three key note addresses will be given at this year's Joint Opening Session. These varied topics will include input from governmental, academic, and petroleum industry representatives who are highly respected for their work and ideas.

Mr. William L. Fisher, President of the National AAPG, will speak on "Small Field Exploration and Large Field Re-Exploration — The Future of Petroleum Geology." In addition to being the President of the national AAPG, Mr. Fisher is Director of the Texas Bureau of Economic Geology and Chairman of the Department of Geological Sciences, both at the University of Texas at Austin. Mr. Fisher is a highly respected lecturer on energy and mineral resources, including geological and policy aspects. Mr. Fisher has also won many awards for his outstanding work in this industry.

Mr. Terry W. Offield is the chief Officer of Energy and Marine Geology (including oil and gas, coal, oil shale, uranium, basin analysis programs), with the United States Geological Survey, Washington D.C. Mr. Offield's topic will be "Current Trends and Advances in U.S.G.S. Energy Research."

Mr. Arthur G. Sylvester will bring the academic point of view in his speech on "Creative Energy — The View from the Ivory Tower." Mr. Sylvester is a professor and Chairman of the Department of Geological Sciences, University of California, Santa Barbara. He has a well rounded background in academics and petroleum geology, with association in many professional societies, several national committees, and numerous honors and lectureships.

Joint Luncheon

This years speaker for the Joint Luncheon will be Ms. Jananne Sharpless, Secretary of Environmental Affairs, State of California, Sacramento. Ms. Sharpless will speak on "California Resource Development and the Public Interest." This topic should be of great interest to our membership.

Take advantage of this opportunity to hear from one of the key environmental officers in the State of California, what California's current and future policy might be.

Annual Meeting

Members are urged to attend the AAPG-Pacific Section Meeting, Thursday, April 17 from 5:30 to 6:30, in the Lake Ming Room of the Red Lion Inn. This is your opportunity to: meet the officers of the section, and help shape your Section.

**GREEN & ASSOCIATES
 PALEONTOLOGICAL SERVICES**

KEITH E. GREEN
 7026 Comstock Avenue
 Whittier, California 90602
 (213) 698-5338

CONVENTION SCHEDULE**Tuesday, April 15, 1986**

7:30-4:40 — San Emigdio Mountains Field Trip (Departs Red Lion Inn)
 3:00 — Exhibits - Set up in the Red Lion Ballroom

Wednesday, April 16, 1986

7:30-4:30 — San Emigdio Mountains Field Trip Day Two (Departs Red Lion Inn)
 8 am-11 pm — Exhibits - (Red Lion Ballroom)
 8:00-4:30 — Three short Courses - (Red Lion Buena Vista Room, and Lake Ming Room)
 9:00-5:00 — Men's and Women's Open Golf Tournament (Kern River Golf Course)
 9:00-5:00 — Spouse's Hospitality Suite (Hilton Inn, Continental Room, Upstairs)
 10:00-3:00 — Women's Par Three Golf Tournament (Kern River Golf Course)
 11:00-3:00 — Tennis Tournament (Laurel Glen Tennis Club)
 Noon-8:00 — Registration (Red Lion Inn)
 6:00-11:00 — Ice Breaker Party - (Red Lion - Buena Vista Room)

Thursday, April 17, 1986

7:00-8:30 — Speakers Breakfast - (Red Lion Inn - Buena Vista Room)
 8:00-11:30 — AAPG-SEPM-SEG - Joint Opening Session and Awards Presentation - (Hilton Inn, Sycamore Room)
 8:00-4:00 — Registration (Red Lion Inn)
 9:00-5:00 — Spouse's Hospitality Suite - (Hilton Inn, Continental Room)
 10:00-3:00 — Kern River Oilfield Tour and Pioneer Village Tour / Lunch (Leaves Red Lion Inn)
 11:30-1 pm — AAPG-SEPM-SEG Joint Luncheon - American Legion Hall, 2020 "H" Street
 1:00-5:00 — AAPG-SEPM-SEG - Joint Technical Session (Red Lion Inn)
 5:30-6:30 — AAPG - Pacific Section Annual Meeting (Red Lion Inn, Lake Ming Room)
 6:30-8:30 — Wine Tasting (Bakersfield Racquet Club)

Friday, April 18, 1986

7:00-8:30 — Speakers Breakfast (Hilton Inn - Sutter Street Bar and Grill)
 8:00-5:00 — AAPG-SEPM-SEG - Joint Technical Session (Red Lion Inn)
 9:00-5:00 — Spouse's Hospitality Room (Hilton Inn, Continental Room)
 11:30-2:00 — Luncheon and Fashion Show (Sheraton Valley Inn)
 12:00-1:30 — Alumni Luncheon (the Wool Growers Restaurant)
 5:30-7:00 — Eastside Symposium - Field Trip Slide Show (Kern County Fairground, Harvest Hall)

New Members

COAST

Charles Adelseck, Keyex Corp., Ventura; **Paul K. Aue**, McClelland Engineers, Ventura; **Douglas Craig**, Exploration Logging USA, Ventura; **Rebecca B. Gilliland**, Gilxco, Santa Maria; **A. John Halunen**, Keyex Corp., Ventura; **Jeff Hamer**, Anad-rill/Schlumberger, Ventura; **Matt Hickle**, Ventura; **Brant K. Hove**, Burns Geological Expl., Ventura; **John C. McCarthy**, Minerals Management Service, Ventura; **John R. Powell**, Staal, Gardner & Dune, Ventura; **Stephanie K. Riess**, Chevron USA, Ventura; **Jon R. Schwaibach**, Exxon, Thousand Oaks, CA; **Paul Webster**, Burns Geological Expl., Ojai, CA; **Robert M. Whitsett**, CGG, Westlake Village, CA; **Craig Williams**, Anadrill/Schlumberger, Ventura; **Don Winslow**, UNOCAL, Santa Paula, CA; **Peter Woolery**, Santa Barbara.

LOS ANGELES

Kevin Green, Green & Assoc., Whittier, CA; **Richard T. Higley**, Texaco Inc., Los Angeles; **Robert L. Horsey**, Petroleum Testing Service, Santa Ana; **Albert R. Kerr**, Long Beach; **Ed Kiessling**, Cal. Div. of Mines & Geology, Los Angeles; **Gerald T. Raydon**, Worldwide Pacific Corp., Torrance, CA; **Montgomerie C. Steele**, Texaco, Universal City, CA; **E. R. Wilkinson**, D.O.G., Long Beach.

NORTHERN CALIFORNIA

Thomas W. Dignes, Chevron, San Ramon; **Melissa L. Wann**, Sonoma, CA.

SAN JOAQUIN

Terry Bacon, Burns Geological Expl.; **Richard M. Drake**, Rockwell International; **Leslie M. Ekas**, Occidental Pet. Corp.; **Richard D. Lewis**, Cities Service Oil Co.; **James H. Ligon**, ARCO; **Joel S. Pomerene**, Santa Fe Energy; **James M. Waldron**, Chevron; **Robert H. Weir, Jr.**, Chevron; **Karl C. Wozniak**, Chevron; all in Bakersfield.

COLORADO

Cathy L. Farmer, Amoco Production Co.,

Denver; **Dr. Loretta Ann Williams**, Champlin Pet. Co., Inc., Englewood.

TEXAS

Clemont H. Bruce, Carrollton; **Fred C. Hankinson**, Sun Exploration & Production, Dallas.

Recommended Reading

U.S. GEOLOGICAL SURVEY

Professional Paper 1360: Evaluating earthquake hazards in the Los Angeles Region — An earth-science perspective, by J. I. Ziony, Editor. (505 pages) \$24.00

EARTHQUAKE INFORMATION BULLETIN

vol. 17, no. 3, May-June, 1985
For sale by the Government Printing Office. Single copy, \$3.00. Annual subscription rate — \$15.00/year

JOURNALS AND BULLETINS

Late Cenozoic landscape evolution on lava flow surfaces of the Cima volcanic field, Mojave Desert, California. By Stephen G. Wells, John C. Dohrenwend, Leslie D. Mcfadden, Brent D. Turrin, and Kenneth K. Mahrer. Geological Society of America Bulletin, v. 96, no. 12 December 1985. p. 1518-1529.

Glacial and syntectonic sedimentation: The upper Proterozoic Kingston Peak Formation, southern Panamint Range, eastern Calif. By Julia M. G. Miller. Geological Society of America Bulletin, v. 96, no. 12 December 1985. p. 1537-1553.

Secular variation, crustal contributions, and tectonic activity in California, 1976-1984. JRG. Journal of Geophysical Research B, v. 90, no. 10, September 10, 1985. P. 8707-8717.

Imaging of earthquake sources in Long Valley Caldera, California, 1983. Bulletin of the Seismological Society of America, v. 75, no. 4, August 1985. p. 105-1020.

The 1979 Palmdale, California, strain event in retrospect. JGR. Journal of Geophysical Research. B. v. 90, no. 12, October 10, 1985. p. 10,301-10,309.

NEWSLETTER

Pacific Section A.A.P.G.
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Bakersfield, California 93302

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Material for publication, requests for previous copies and communications about advertising costs should be addressed to RUSS H. ROBINSON, P.O. BOX 10561, BAKERSFIELD, CA 93389.

CHANGE OF ADDRESS, subscription, and membership inquiries should be directed to MEMBERSHIP SECRETARY, PACIFIC SECTION A.A.P.G., P.O. BOX 1072, BAKERSFIELD, CALIFORNIA 93302.

PUBLICATIONS COMMITTEE: Pacific Section American Association of Petroleum Geologists, 3600 S. Harbor Blvd., Box 198, Oxnard, CA 93030.

Predicting the next great earthquake in California. Scientific American, v. 252, no. 2, February 1985. p. 35-43.

Marine petroleum-source and reservoir rocks, Miocene Monterey Formation, California. Beijing petroleum geology symposium. China Natl. Oil and Gas Explor. and Dev. Corp., Circum-Pac. Energy and Mineral Resources Council., 1984.

Death Valley bright spot: A midcrustal magma body in the southern Great Basin, California? Geology (Boulder), v. 14, no.1, January 1986, p. 64-67.

Compiled by: Louis Lopez
USGS, L.A.



PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

of the Pacific Section
American Association of Petroleum Geologists

APRIL/MAY 1986 NO. 3

PRESIDENT'S CORNER . . .

The Annual Business Meeting for 1985-86 was held on Thursday, April 17, during the 61st Annual Convention, at the Red Lion Inn, Bakersfield. The following was reported: Dues were raised to \$10.00 (the first time in 15 years) to meet increased costs of printing and mailing; the History Volume was prepared and will be ready for distribution in June; the Directory, in a new format, was ready for the convention, and was distributed to all members present; for the first time, the Pacific Section requested National AAPG to handle the exhibits (booking, collections and arrangements) for the Convention Exhibits.

The 1986 Convention was a successful one, with 1150 registered members and guests and 31 exhibitors. Our National President, Bill Fisher; National President-Elect "Bruno" Hanson and several National officers and candidates were also present. At the Opening Sessions, all awards were presented: Two Honorary Life Memberships, to Richard Hester and Spencer Fine; a new Teacher's Certificate to Dr. William "Bill" Easton; a Journalism Award to Bill Rintoul; and one (1) Van Couvering Award to student Cheryl Blume of Cal. State Bakersfield. The Joint Luncheon was held at the American Legion Hall, and featured Jan Sharpless, Secretary of Environmental Affairs, of the Calif. State Office in Sacramento. Technical sessions were held in both the Red Lion and the Hilton Inn, next door, with the exhibits in the Red Lion Inn. Our thanks are extended to "Rick" Rowersox and his hard-working committee for the successful event, from the Technical Sessions, to the tasty barbeque and interesting field trips. Even the weather cooperated.

The 1987 Convention will be the National, to be held in June in Los Angeles. Plans are being made for Pacific Section to sponsor field trips and seminars. The 1988 Pacific Section Convention will be held in Ventura — another first for our organization. Hans Schwing has been selected as General Chairman.

During the past year, the Executive Committee meetings were held to coincide with the meetings of the San Joaquin Valley Geologic Society, the Coast Society and the LA Basin Geologic Society, with the meetings occurring in the conference rooms of Union Oil in Bakersfield or Ventura, or Taix

Restaurant in Los Angeles, at no expense to the organization.

There's money in the Treasury, as we change officers on July 1.

CONVENTION SUCCEEDS

The 1986 Pacific Section Annual convention is now history. Although the convention committee hasn't filed its final report, the preliminary results look good, with 1,150 paid registrants in spite of the recent industry down turn.

Honors Awards

Six awards were presented at the Pacific Section Convention in Bakersfield, CA, April 17, 1986. Recipients included three members of the Pacific Section.

Ronald C. Crane of Chevron Overseas Petroleum, Inc. received the Levorsen Award for the best paper presented at the 1985 Convention in Anchorage, Alaska. The title of this paper was "Arctic Reconstruction from the Alaskan Viewpoint."

Richard L. Hester, consulting geologist, was awarded Honorary Life Membership in the Pacific Section. Dick Hester, UCLA '50, was a geologist with Signal Oil and Gas Company for many years. He has published papers on the Middle East and Guatemala and for the past few years has been Publications Coordinating Chairman for the Pacific Section. He was vice president of the Pacific Section in 1967 and president in 1971. His citation was given by Bob Hacker.

Spencer Fine, consultant, was awarded Honorary Life Membership. He had a long career as geologist with Richfield Oil Corporation and later ARCO. Before retirement he represented Texfel Petroleum Corporation in Singapore. Spence was vice president of the Pacific Section in 1962 and president in 1964. his citationist was K. B. "Pete" Hall.

(Continued on page 2)

GREEN & ASSOCIATES PALEONTOLOGICAL SERVICES

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7026 Comstock Avenue
Whittier, California 90602
(213) 698-5338

IN MEMORIAM Paul Siemon 1919 - 1986

Paul Siemon, age 66, Consulting Geologist, member of AAPG, GSA, and a past president of the Coast Geological Society, passed away on May 4, 1986 in Santa Barbara, California, after a very brief illness. His Geological career spanned 40 years.

Paul was born September 19, 1919 in Bakersfield, California. He graduated from the Colorado School of Mines with an Engineering Geology degree in 1944 and served in the U.S. Navy during World War II.

His first job was with Getty in Bakersfield from 1946 to 1951. Next he became a consultant for two years. Finding this unsatisfying, he joined Continental Oil Company for a varied career in Geology and Geophysics in California, Wyoming, and Louisiana.

In 1977, he left to form the Siemon Oil and Gas Company, working jointly with Lee Molesworth of Shoshone Oil Company, Ventura. His first prospect was sold to Occidental Oil Company, and it was an Eocene Sand discovery called the Chafee Canyon oilfield, located southwest of the town of Piru. This was followed by two successful gas wells, a deeper zone discovery and a field extension in the Oakley area of Northern California.

Paul was a very competent geologist, and a good-hearted unassuming person who was liked and respected by all who knew him. Paul would go out of his way to be helpful. He loved the game of golf, and enjoyed his family and friends to the fullest.

He is survived by Gene Estelle Siemon, his beloved wife, two sons, two daughters, a sister and two brothers and two grandchildren. A memorial service was held May 7 at Carpinteria Community Church. Private inurnment was at Carpinteria Cemetery.

Memorial donations may be made to Phoenix of Santa Barbara, Inc., 107 East Micheltorena Street, Santa Barbara, California 93102.

(Continued from page 1)

William H. Easton, Professor of Geology Emeritus at the University of Southern California, was the recipient of a new award, the Special Teaching Award, in recognition of outstanding contributions made in the teaching of the art and science of geology and in preparing students for careers in petroleum exploration. His citation was given by James B. Anderson.

William "Bill" Rintoul was the recipient of the Special Journalism Award in recognition of notable journalistic achievement concerning exploration for petroleum in the western United States. His citation was given by Hy Seiden.

Cheryl Blume, a geology student at California State University at Bakersfield, California, was presented with the Martin Van Couvering Geological Student Award.

John E. Kilkenny, Chairman
Honors & Awards Committee

Loversen Memorial Award

This year's AAPG Loversen Memorial "Best Paper" Award was given to: **E. R. Chamberlain** (speaker) and **V. M. Madrid** (co-author), Chevron USA Inc., San Ramon, CA, for the AAPG Westside Session paper "Influence of Uplift on Oil Migration: Tulare Heavy Oil Accumulations, Westside San Joaquin Valley, CA."

...Top papers selected in the other sessions were as follows:

EASTSIDE SYMPOSIUM

Roger B. Block, Stanford University; "Ramp" — style deposition of the Oligocene Vedder Fm., San Joaquin Valley"

OR-WA—NV SESSION

Kenneth E. Telleen, Conoco Inc., Ventura, CA; "Merging seismic and MT in Garden Valley, Nevada"

OPEN SESSION

Don Clark (speaker), **Curtis Henderson** (co-author), Tidelands Agency, Long Beach, CA; "Creative use of computer software improves geologic results"

LOG SESSION

Deborah M. Olson, Texaco Inc., Bakersfield, CA; "Calibration of log and core saturation data: case history from San Ardo Field"

Cheryl Schussler

Convention Awards Chairman

Sellers/Buyers Service Spuds In

The Production Exchange, a monthly information service publishing ads for the oil industry issued volume 1 number 1 in May from Bakersfield. The service was started by Rand Cantrell and Bob Taylor. It lists for sale or purchase production/producing properties, developmental drilling programs, royalty interests, and mineral rights. Also listed are

available farmout/farmins, drilling partners, seismic/well data, and wanted equipment.

The majority of the listings published thus far pertain to Central California, but some were for properties outside of California which were being handled by California companies.

For more information contact: The Production Exchange, 1701 F Street, Bakersfield, CA 93301; (805) 327-0178.

New Members

ALASKA

Donald C. Hartman—Texaco, Anchorage.

COAST

Tyrell C. Axtmann—Conoco; **Alexander E. Benton**—Benton Petroleum; **Eric Jardine**—UNOCAL; **Bill Polske**—Texaco; **Michael F. Ponek**—Texaco; **D. C. Slater**—Chevron USA; **William Tracy**—UNOCAL, all in Ventura; **Frederick Schultz**—Pauley Petroleum, Ojai.

LOS ANGELES

James W. Biggs—Sun E&P, Valencia; **Steven A. Fields**, Westminster; **Timothy K. Martin**—Sun E&P, Valencia; **Jill Hoffman**—Texaco, Universal City; **Edgar W. Wel-labum**—Republic Drilling, Long Beach; **Jack W. West**—Texaco, Los Angeles.

SAN JOAQUIN

Gene Blasdel—ARMA Geophysical; **Thomas H. Butler**—ARCO; **George F. Can-jar**—Shell; **Jeffrey Everett Fulmer**—Tenneco; **Mike Glinzak**—D.O.G.; **Rex F. Hepp**—Energy Log; **John Krupa**—ARCO; **Gary K. Lester**; **Steve Lewis**—Santa Fe Energy; **Magi Nielsen**—Cities Service; **Malcom Mossman**—Consultant; **Susan Patzer**—Texaco; **C. Wesley Porter**; **Kenneth Witte**—D.O.G.; All in Bakersfield.

NORTHERN CALIFORNIA

R. E. Chamberlain—Chevron, San Ramon.

SACRAMENTO

Bill Guerard—D.O.G., Sacramento.

OTHER STATES

Rodger Hutson—Golden Buckeye Petroleum; **Donald E. Wilde**—Wilde Inc.; Denver, Colorado; **Alexander Davidson**—Exxon, Kingwood, Texas.

Board of Registration Issues Directory

The 1985 directory of registered geologists, geophysicists, and certified engineering geologists was printed in March 1986. This is the first directory printed since 1977, and includes all licenses in good standing as of December 1, 1985. The directory has registrees listed alphabetically according to license held.

There are a limited number of copies available, free, by written request from: State Board of Registration for Geologists and Geophysicists, 1021 "O" Street, Sacramento, CA 95814.

Los Angeles

This year's Los Angeles Basin Geologic Society student paper award winner is Daniel A. Yamashiro, Department of Geological Sciences, California State University, Northridge. Mr. Yamashiro will give his paper, Eocene Marine to Nonmarine Deltaic Deposits, Lower Piru Creek, Los Angeles and Ventura Counties, California, at the LABGS June meeting. His abstract is given below for those who will be unable to attend.

A 790-m-thick stratigraphic section of lower middle Eocene sandstone represents a regressive tide-dominated deltaic sequence that grades upward from delta front through lower delta plain into upper delta plain. The sandstone crops out as a narrow strip of east-west trending strata within the Piru Hills, 65 km north of Los Angeles, California.


The sandstone gradationally overlies prodelta/transition-zone siltstone of uppermost "Capay stage" (early Eocene) and underlies, with a 15° angular unconformity, Oligocene to Miocene(?) non-marine boulder conglomerate of the Sespe Formation.

The lower 95 m of the sandstone is characterized by an upward-coarsening sequence, fine at the base to medium at the top, laminated to bioturbated sandstone. Bioturbation is as high as 75% with **Ophiomorpha** burrows common. Shallow-marine molluscs diagnostic of the "Domengine stage" (late early through early middle Eocene) occur within lenses of medium sandstone. These rocks were deposited as a delta front.

Above the delta-front deposits are about 100 m of coarse sandstone. Structureless and bioturbated sandstone is dominant but bidirectional crossbedding, planar crossbedding, and planar laminations are common. Structures are interpreted as megaripples, sandwaves and channels as a result of ebb-and-flood flow in a tidal-flat environment within a lower delta plain. This tidal flat differs from most cited modern examples because it lacks a mud component or associated mud-flat deposits. Overlying these rocks is a 205 m interval of interfingering tidal-flat and upper delta plain deposits.

The remaining 390 m consists mostly of a sequence of fining-upward cycles overlain by an interval of structureless sandstone. Locally coal and lignite lenses are common. This section represents a supratidal and braided-river environment on

the upper delta plain. Coal lenses are interpreted to be marsh deposits within the supratidal zone. Cross-bedded conglomerate, trough cross-bedded coarse sandstone, variegated sandstone and mudstone and structureless sandstone are interpreted to be channel bars, megaripples and abandoned channel deposits formed from the continuous migration of a braided-river system.



Alan R. Hershey
Consulting Geologist
BIOSTRATIGRAPHY • STRATIGRAPHY
REGIONAL STUDIES

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As Regular As . . .

The epicenters of two foreshocks of magnitude 6 in 1857, as well as the epicenter of the 1857 main shock, were probably located on the San Andreas fault near Parkfield. Since 1857, earthquake sequences with main shocks of magnitude 6 have occurred near Parkfield on 2 February 1881, 3 March 1901, 10 March 1922, 8 June 1934, and 28 June 1966. The times between sequences since 1857 are remarkably uniform, with a mean interval of 21.9 ± 3.1 (standard deviation of the mean) years. Although the time of the 1934 sequence departs from the regular pattern by occurring a decade too early, the time of the 1966 sequence conforms to the regular pattern, in that the 44 years between 1922 and 1966 is twice the mean interval.

The source of the 1966 earthquake can be described by a simple model: unilateral rupture propagation southeast over the rupture zone, a 20- to 25-km-long section of the San Andreas fault bounded by two geometric discontinuities in the fault trace that apparently control the extent of rupture. The northwest discontinuity, adjacent to the epicenter of the 1966 main shock on Middle Mountain, is a 5° change in the strike of the fault trace; the southeast discontinuity is a 1-km echelon offset (right step) in the fault trace near Gold Hill. The Parkfield preparation zone is the 1- to 2-km-long section of fault at the northwest end of the rupture zone; the preparation zone is defined to include the 5° bend in the fault trace and the epicenters of the 1966 main shock and its foreshock ($M_L 5.1$).

The 1934 and 1966 Parkfield sequences were remarkably similar. The main shocks had identical epicenters, magnitudes, fault-plan solutions, and unilateral southeastward ruptures. Moreover, identical foreshocks of $M_L 5.1$ preceded each main shock by 17 minutes and the lateral extent of aftershock epicenters in 1966 repeated that in 1934. The location and extent of surface faulting in

1934 were similar to those in 1966, and anecdotal reports suggest that, after the 1922 and 1901 events, cracks were found in some of the same places as well. Intensity patterns for the Parkfield shocks in 1901, 1922, 1934, and 1966 are similar; the few reports available for the 1881 Parkfield shock are consistent with the intensities reported for the more recent shocks. The epicentral location of the main shock in 1922 is constrained to the 18-km-long section of the fault northwest of the rupture zone. Comparisons of seismograms for the 1922, 1934, and 1966 main shocks recorded in Europe, North America, and South America suggest that, within the experimental errors of 10 to 20 percent, the seismic moments for the three shocks were equal.

Although few data are available for Parkfield sequences before 1934, they are consistent with the proposal that the main shocks in 1881, 1901, and 1922 were similar to those in 1934 and 1966. The similarities in the main shocks suggest that the Parkfield section of the San Andreas fault is characterized by recurring earthquakes with predictable features.

The significant recent seismic activity on the San Andreas fault near Parkfield is concentrated near the ends of the 1966 rupture zones, the same spatial pattern that preceded the 1979 Coyote Lake and 1984 Morgan Hill earthquakes. Seismic activity on the creeping section northwest of the preparation zone is characterized by shallow focal depths and a small average magnitude, which are typical features of seismicity along the creeping section of the fault northwest to San Juan Bautista. The recent seismicity within the rupture zone mimics the spatial and magnitude distributions of the 1966 aftershocks, even though the events occurred well after the end of the 1966 aftershock activity. Apparently, the distribution of seismicity within the rupture zone is controlled by relatively stationary fault zone properties, such as geometry or rock type.

The seismic activity near the preparation zone is most critical for short term earthquake prediction. All but one of the $M \geq 4$ shocks in the Parkfield area since 1969 have occurred within 1 to 2 km of the preparation zone. On 13 September 1975, a shock of $M_L 4.9$ with low static stress drop occurred 5 km northwest of the preparation zone; rupture propagated southwest, apparently stopping near the preparation zone. This shock appears to be similar in many respects to the early foreshock in 1934 (and to the shock of $M_L 5$ on 16 November 1956), but it did not trigger an early characteristic earthquake, although it did initiate the current active phase of the seismic cycle. Since 1975, a number of clusters of magnitude 3 shocks, the most recent in June 1982, have occurred near the preparation zone.

It is possible that the next characteristic Parkfield earthquake might break through the en echelon offset at the southeast end of the rupture zone and continue southeast along the

San Andreas fault, growing into a major earthquake. Alternatively, the characteristic earthquake might stop at the en echelon offset and, by analogy to the triggering mechanism of the early foreshock of $M_L 5.0$ in 1934, increase the right-lateral shear stress on the fault southeast of the rupture zone. The latter case has been suggested as the triggering mechanism for the great Fort Tejon earthquake of 1857. Continuation of a Parkfield earthquake southeast might result in a rupture length of about 90 km, which is consistent with a magnitude 6.5 to 7 earthquake. Since the average Holocene offset rate across the San Andreas fault at Wallace Creek is 3.5 cm per year, it seems likely that the 3.5 m of slip in 1857 has largely been recovered, so that the possibility of an earthquake breaking this segment must be taken seriously.

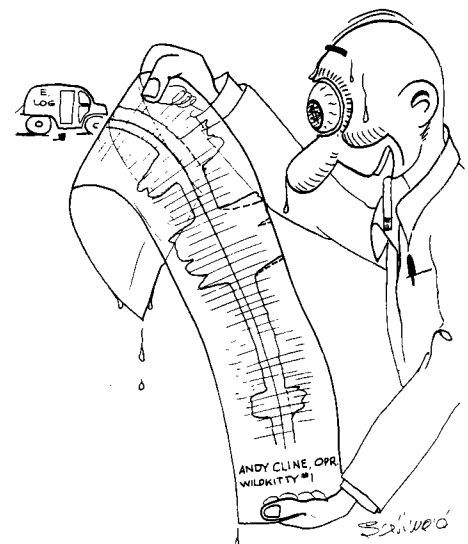
From Barun & Lindl, *Science*, Vol. 229, No. 4714

Pacific Section Election Results

The Pacific Section AAPG officers for the 1986-87 term are:

President Robert G. Lindblom
President-Elect Dan E. Pasquini
Vice President Jack E. West
Secretary Bonnie Bloeser-Cooper
Treasurer Keith E. Green

With the exception of the President, who was elected last year as President-Elect, and the Treasurer, who is elected for two years in order to maintain fiscal continuity, these officers will begin their duties July 1, 1986.



Recommended Reading

BOOKS

- The Geology and Hydrocarbon Resources of Negara Bruni Daussalam, edited by D.M.D. James (1984), Brunei Shell Petroleum Co. Berhad, Seria, Brunei, US\$25
- Biogenic Structures; Their Use in Interpreting Depositional Environments, edited by H. Allen Curran (1985), SEPM, P.O. Box 4756, Tulsa, OK 74159. Price \$29 (AAPG & SEPM members), \$36 (non-members).
- Dictionary of Rocks, by Richard S. Mitchell (1985). Van Nostrand Reinhold Co. Inc., New York, \$29.95
- Pattern Recognition Problems in Geology and Paleontology, by Ulf Bayer (1985), Lecture Notes in Earth Sciences 2. Springer-Verlag. \$19.50
- Cased-Hole Log Analysis and Reservoir Performance Monitoring, by R. M. Bateman (1985). International Human Resources Development Corp. 137 Newbury Street, Boston, MA 02116. \$58.
- Practical Petroleum Geology, by J. Morris, R. House, and A. McCann-Baker (1985). Petroleum Extension Service, Univ. Texas at Austin.
- Exploration Software and Data Sources for Micros (Sept. 1985). A special publication of the Houston Geological Society.
- Enhanced Oil Recovery, Volume 1, Fundamentals and Analysis, edited by E. C. Donaldson, G. V. Chilingarian, and T. F. Yen (1985). Developments in Petroleum Science 17A. Elsevier Science Publishing Co. US \$67.25
- Petroleum Resource Assessment, edited by Charles D. Masters (1984) International Union of Geological Sciences Publication 17. Distributed by IUGS, Rm. 177, 601 Booth St., Ottawa, Ontario K1A 0E8, Canada. US\$20.
- Clay Minerals: A Physico-Chemical Explanation of Their Occurrence, B. Velde (1985). Developments in Sedimentology 40. Elsevier Science Publishers, Amsterdam. US\$59.25.
- Coastal Crude: In a Sea of Conflict, R. E. Kallman and E. D. Wheeler (1985). Pathfinder Publishing, Ventura, CA, \$12.95.
- Coring Operations: Procedures for sampling and analysis of bottomhole and sidewall cores; ed. by A. Whittaker (1985) IHRDC, \$29.
- Early California Oil: A Photographic History, 1956-1940, by K. A. Franks and P. F. Lambert (1985). Texas A&M Univ. Press, College Station, Texas, \$34.50
- Encyclopedia of Well Logging, by Desbrandes (1985) Gulf Publishing Company, \$89.95
- Practical Seismic Interpretation, by M. E. Badley (1985), IHRDC, \$62.
- U.S. Conventional Oil and Gas Production: Prospects to the year 2000 by J. P. Riva, Jr., J. J. Schanz, Jr., and J. G. Ellis (1985), Westview Press, \$23.50
- Carbonate Petroleum Reservoirs, ed. by Perry O. Roehl and Phillip W. Choquette (1985), Springer-Verlag, \$59.
- Elsevier's Invertebrate Fossils Chart (1985) Elsevier, \$15
- Formation Evaluation: Geological Procedures, ed. by A. Whittaker (1985) IHRDC
- Illustrated Petroleum Reference Dictionary, compiled by R. D. Langenkamp (1985), PennWell Publishing, \$69.75
- Paleoalgebra: Contemporary research and Applications, ed. by D. F. Toomey and M. H. Nitechi (1985), Springer-Verlag, \$65
- Paleontology, Paleocology, Paleogeography, ed. by J. T. Duto, Jr., and H. W. Pfefferkorn (1986), Southern Illinois Univ. Press, \$75
- Provenance of Arenites, ed. by G. G. Zuffa (1985), Kluwer Academic Publishers, Massachusetts, \$50
- Sandstone Depositional Models for Exploration for Fossil Fuels, by G. deVries Klein (1985) \$48
- Storm Depositional Systems: Dynamic Stratigraphy in Modern and Ancient Shallow-Marine Sequences, by T. Aigner (1985), \$14.50 Springer-Verlag
- Vertical Seismic Profiling: Technique, Applications, and Case Histories, by A. H. Balch and M. W. Lee (1984), IHRDC, \$58

PACIFIC SECTION — AMERICAN ASSOCIATION PETROLEUM GEOLOGISTS OFFICERS 1985 - 1986

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NEWSLETTER

Pacific Section A.A.P.G.

P.O. Box 1072

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FIRST
CLASS



PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

of the Pacific Section
American Association of Petroleum Geologists

JUNE/JULY 1986 NO. 4

Plaudits for Convention Chairman and Committee

"RICK" BOWERSOX and his 1986 CONVENTION COMMITTEE have completed the final accounting and settled their accounts with the Pacific Sections. The check for the Convention profits was presented to the Executive Committee at their meeting on 29 July. The total profits were \$28,298.91 (to be shared with SEPM and SEG). As Rick stated, "Considering the severe economic decline of the oil industry during 1986, this convention was an outstanding economic success."

The 1986 Convention Committee was outstanding, and all members of the Pacific Sections of AAPG-SEPM-SEG extend grateful thanks for this excellent and outstanding job that they did for all of us.

Rick has volunteered to assist future Convention Chairmen. That's the spirit that makes us such a wonderful organization.

U.S. OKs 4 More Units For Offshore Oil Drilling

The Interior Department's Minerals Management Service approved four more units for the offshore portion of the Santa Maria Basin.

Approval of the units sets the stage for further exploration and development. Earlier, Minerals Management Service had approved two units. The six units are in the area opened by OCS Sale 53 in May 1981.

The newly approved units are Lion Rock, Santa Maria, Purisima Point and Bonito. Phillips Petroleum Co. is the designated operator for the Lion Rock Unit, which at the nearest point lies 12 miles southwest of Pismo Beach.

The unit includes six tracts, comprising OCS-P 0396, 0397, 0402, 0403, 0408 and 0414. Phillips has been credited with discoveries on 0396, 0397, 0403 and 0408. The latter two tracts appear to be extensions of the San Miguel field which Cities Service is preparing to develop from Platform Julius. Phillips and Chevron paid bonuses totaling

\$423.24 million for the tracts.

Atlantic Richfield Co. is the operator for the Santa Maria Unit, which lies 16 miles northwest of Point Arguello. The unit includes all of OCS-P 0420, 0424, 0425, 0430, 0431 and 0434 and portions of OCS-P 0429 and 0433.

Arco is credited with a discovery on OCS-P 0420 and presently is drilling on OCS-P 0434. Among those sharing interest with Arco in the unit are Amoco, Elf Aquitaine, Champlin, Phillips, Cities Service, Shell, Samedan, Celeron, Reading & Bates, Texas Eastern Exploration and Ogle Petroleum. Bonuses for the eight tracts totaled \$399.35 million.

Pennzoil is the operator for the Purisima Point Unit, which lies three miles offshore from Purisima Point. The unit includes OCS-P 0426, 0427 and 0432. Pennzoil is credited with a discovery on OCS-P 0427. Others with interest in the unit include Chevron, Phillips, Texas Eastern, Ladd, Fluor Oil & Gas, Samedan, Reading & Bates, Ogle and Celeron. Bonuses for the three tracts totaled \$58.75 million.

The fourth newly approved unit is the Bonito Unit for which Chevron is the operator. The unit includes the northwest por-

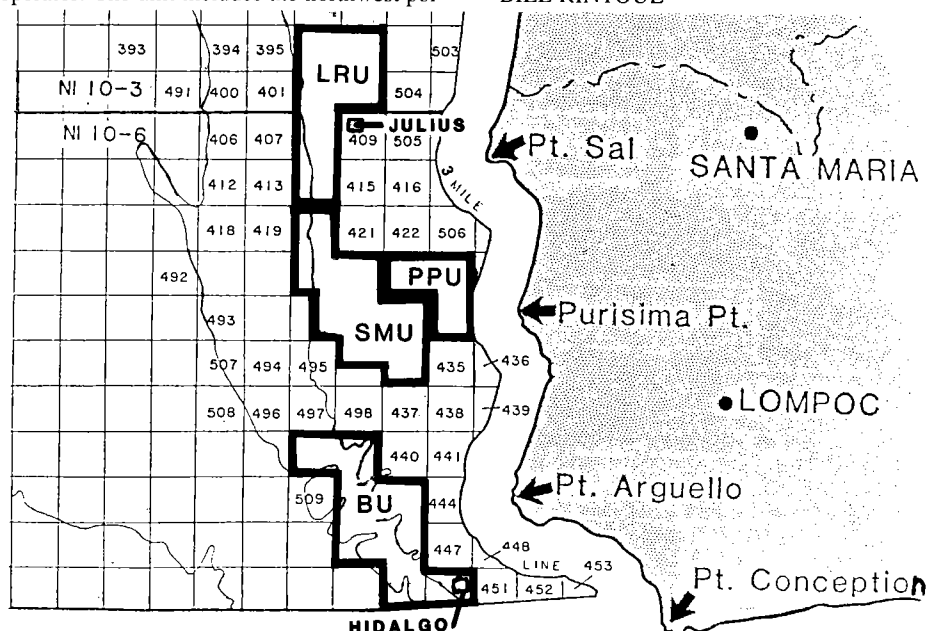
tion of the Point Arguello field and other tracts to the northwest. Tracts in the unit are OCS-P 0443, 0445, 0446, 0449 and 0450 from OCS Sale 53 and OCS-P 0499, 0500 and 0510 from two later sales.

Chevron has been credited with discoveries on OCS-P 0443, 0446 and 0450, while Texaco-Sun's 0449 was the site of a discovery by Getty, now part of Texaco. Bonuses for the eight tracts totaled \$400.31 million. The bonus of \$333.6 million paid by Chevron-Phillips for OCS-P 0450 is the largest every paid for an offshore tract. Chevron plans to develop the tract with Platform Hidalgo.

Those sharing interest in the Bonito Unit include Chevron, Phillips, Texaco and Sun Exploration & Production Co.

The two previously approved units are the Point Sal Unit, which at the near point lies four miles west of Point Sal, and the Rocky Point Unit, which lies off the northeast flank of the Point Arguello field. Sun is the operator for the Point Sal Unit, which includes OCS-P 0415, 0416, 0421 and 0422. Chevron is the operator for the Rocky Point Unit, which includes OCS-P 0447, 0448, 0451, 0452 and 0453.

BILL RINTOUL



OCS Santa Maria Basin — Outlined in a bold border are the recently approved: Lion Rock (LRU), Purisima Point (PPU), Santa Maria (SMU), and Bonito (BU) units. Also shown (as open rectangles) are Julius and Hidalgo, two platforms mentioned above.

ERRATUM

In the April/May issue, under New Members, Bill Polske was listed as an employee of Texaco. The listing should have read Bill Polski — Benton Petroleum, Inc. Sorry about that Bill. Editor.

President's Corner...

It is with great pleasure and honor that I may serve as President of the Pacific Section AAPG. I am looking forward to working closely with the Executive Committee and other committee chairmen during the year.

It has been a very satisfying and learning experience working the past year with Lucy Birdsall. Her successful term was climaxed by the annual meeting in Bakersfield plus laying the ground work for our Section as host to the National AAPG meeting in Los Angeles in 1987. Lucy is the first woman to serve as President and I predict not the last.

There are two primary objectives on which I would focus the Section's attention this year. First concerns the very tough times the oil and gas industry is facing today. No part of the industry has been devastated more than geoscientists. In oil publications and newspaper articles, layoffs and voluntary and involuntary termination plans in upstream operations are common. In fact, there is the probability that 50% of the membership of the National AAPG will be unemployed by 1987. I believe the Section can and should help members in job placement within the industry or alternative scientific fields. The National AAPG has formed a committee for alternative employment. The Section will work closely in any way with National in this vital matter.

Secondly, the Section will focus its attention and resources to assure a successful National AAPG meeting in Los Angeles, June 7-10, 1987. The theme is "LA's the Place!" Bud Reid, General Chairman, has assembled a talented and industrious committee. Our Section will not only act as host but sponsor short courses and field trips. Plan now to attend. — ROBERT LINDBLOM

Past President's Wrap-Up

The year 1985-86 was challenging and successful — because members of the EXECUTIVE COMMITTEE, the ELECTED OFFICERS and the CONVENTION COMMITTEE (under the leadership of RICK BOWERSOX), and everyone else contacted to help, did all the assigned tasks so competently. My thanks to each and everyone for cooperation and assistance, all year long.

A Thank You to the members of the Pacific Section, for the honor given me, when you elected me to serve as your "first woman" president. It has been a thrilling year. May I add one more "thank you" — to the Executive Committee members, for the lovely gold Cross pen presented to me at the meeting 29 July. I shall enjoy using it, and thinking of our year of work together.

I wish the incoming officers, the Executive Committee, and all members, a successful year, under the leadership of President Bob Lindblom. — LUCY BIRDSALL

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Repository to Issue New Catalog

The California Well Sample Repository is finalizing the fourth edition of its catalog of cores and cuttings available for study at its facilities on the campus of California State Bakersfield. Since the 3rd edition was issued in January 1983 the repository has increased the number of well, with core available, from 1900 to 3000. The new catalogs will cost \$3 and are scheduled for release October 1, 1986.

In order to offset printing cost the Repository is offering business card advertisement space in the catalog at \$20 per card. The deadline for submission of cards is August 20, 1986.

To receive your copy of the 4th edition and/or place your business card ad send the appropriate check and information to: California Well Sample Repository, C.S.B., 9001 Stockdale Hwy., Bakersfield, CA 93309.

Additional information can be obtained from Victor Church (805) 325-5924 or James R. Weddle (805) 395-3029.

California Registration Board Newsletter

The State Board of Registration for Geologists and Geophysicists of California published issue #2 of its newsletter this spring. This seven page newsletter has: an introduction by Board president William H. Park, a summary of Board activities with a resumé for each member, examination results (number of examinees and number passed) for 1983 through 1985, a run down by the Examination Committee Chairman John W. Williams of the procedure his committee uses to up date the examinations, plus guidelines for geophysical and ground water investigation reports.

Copies are available from the Board office, and may be obtained by written request addressed to 1021 O Street Room A-190, Sacramento, CA 95814.

**PPG DEADLINE
for AUG./SEPT. ISSUE
SEPTEMBER 22**

Pipeline Takes Another Step

Pacific Texas Pipeline Co. has let another contract for its proposed 1,030 mile, 42 in. crude oil pipeline from Long Beach, Calif., to Midland, Tex.

Pactex let a \$30 million contract to Bredero Price Inc., Houston, to coat the steel pipe. The contract is one of the largest single contractor coating projects awarded in the U.S., says Noel Duckworth, president of Bredero Price.

Suricote Inc., a Bredero Price affiliate, will coat the pipe at plants in Houston and Napa, Calif.

The plants will be set up near the sites at which the pipe will be manufactured. Pipe manufacturers are a U.S. Steel Corp. plant at Baytown, Tex., and a California Steel/Kaiser Steel plant at Napa.

Coating is expected to start at both plants in late 1986 and continue into 1987.

The 900,000 bbl, \$1.66 billion pipeline is expected to start up in late 1987.

It is designed to transport mainly Alaskan crude, which can be distributed at Midland through 14 existing pipelines to Gulf Coast, Midwest, and Eastern refineries.

From O&GJ

Alaska Drops Leasing Sales

Alaska has withdrawn two highly prospective oil and gas lease sales from its current 5 year schedule because it fears that litigation and environmental strictures would ruin bidding for acreage.

Sales originally planned early in the fall in the Beaufort Sea and an area adjoining the National Petroleum Reserve-Alaska (NPR-A) may not be conducted until 1990.

DNR Commissioner Esther Wunnicke rescheduled Sales 52 and 52A from September 1986 to a date to be announced in the next 5 year lease sale, due to be published in January 1987.

Sale 52 will offer Beaufort Sea acreage from Pitt Point to Tangent Point off the NPR-A (see map, O&GJ, Nov. 7, 1983, p. 73). Sale 52A will offer nearby onshore acreage in the Nechelik area adjoining NPR-A.

Under Alaska law, if a sale is rescheduled more than 90 days beyond the last day of the calendar quarter in which it was originally proposed, the new date must be announced in the 5 year program. The sale then can't be conducted until the third year following its reappearance in the program.

Boundary disputes and uncertainty over offshore development costs likely would devalue the state leases if they were offered for sale now, Wunnicke said.

Ownership of lagoons between the Barrier Islands and the NPR-A mainland is disputed, as is title to some submerged lands along the Territorial Sea boundary.

From O&GJ

REVIEW OF THE KERN RIVER VEDDER POOL DEVELOPMENT

MICHAEL CONDON
 Texaco, Bakersfield

The search for oil from deeper zones beneath the Kern River Field began almost 80 years ago. However, it was not until 1981, when Getty Oil Company's Apollo WD-1 well discovered oil within the Vedder Formation, that this search came to fruition.

The Kern River Field was discovered in 1899 and has produced over one billion barrels of viscous 13° crude from an average depth of 900 feet within the Plio-Pleistocene Kern River Formation. The trap for the heavy oil is formed by permeability variations on a homocline and lateral pinchout of the sands. However, since its discovery, attempts have been made to find oil within the approximately 5000 feet of sediments below the Kern River Formation.

In early 1981, Getty Oil Company planned to drill a waste water disposal well in the southern portion of the Kern River Field to be used for injection of brine produced from steam flood operations. The proposed injection zones were the Famoso and Vedder sands. The drilling of such a well was seen as an opportunity to test zones below the Kern River Formation for potential hydrocarbon accumulations. Zones of interest included the Santa Margarita, Olcese, Vedder and Famoso (see Fig. 1). The Vedder Formation was of particular interest in that it is a very prolific producer throughout the south-east San Joaquin Valley, being the reservoir for such giant oil fields as Mount Poso and Round Mountain. As early as 1904, the Vedder had been an exploration target within the Kern River Field. By 1981, over two dozen Vedder wells had been drilled within the

field. Many had good oil shows, although none had encountered oil in commercial quantities.

Within the Kern River Field, the Oligocene Vedder Formation averages 1100 feet in thickness and consists of four to five individual Vedder "sands". Each "sand" is a coarsening upward package, from silt at the base to coarse sand at the top ranging in thickness from 100 to 300 feet. The sands show good lateral continuity throughout the field.

The structure on top of the Vedder Formation in the Kern River Field is a homocline striking roughly N40°W dipping 4-6° to the southwest. The homocline is cut by a series of intersecting normal faults. A structural review of the Vedder Formation prior to drilling of the disposal well indicated the presence of a northwest-southeast trending, eastward-dipping normal fault in the center of the Kern River Field. Such faulting forms the traps within the Mount Poso and Round Mountain fields to the east by dropping the overlying impermeable Freeman-Jewett silt down against the productive Vedder sands. The faults in Round Mountain show up to 350 feet of vertical displacement, while those mapped in Kern River show 50-70 feet.

Using Round Mountain as a model, the original location of the waste disposal well was moved to test the theorized fault trap, and in May, 1981, Getty Oil Company spudded Apollo WD-1, located in the northeast quarter of Section 4, T29S/R28E. The well was drilled to a total depth of 5846 feet within the Walker Formation. Wireline logs gave

(Continued on page 4)

TYPICAL LOG KERN RIVER FIELD

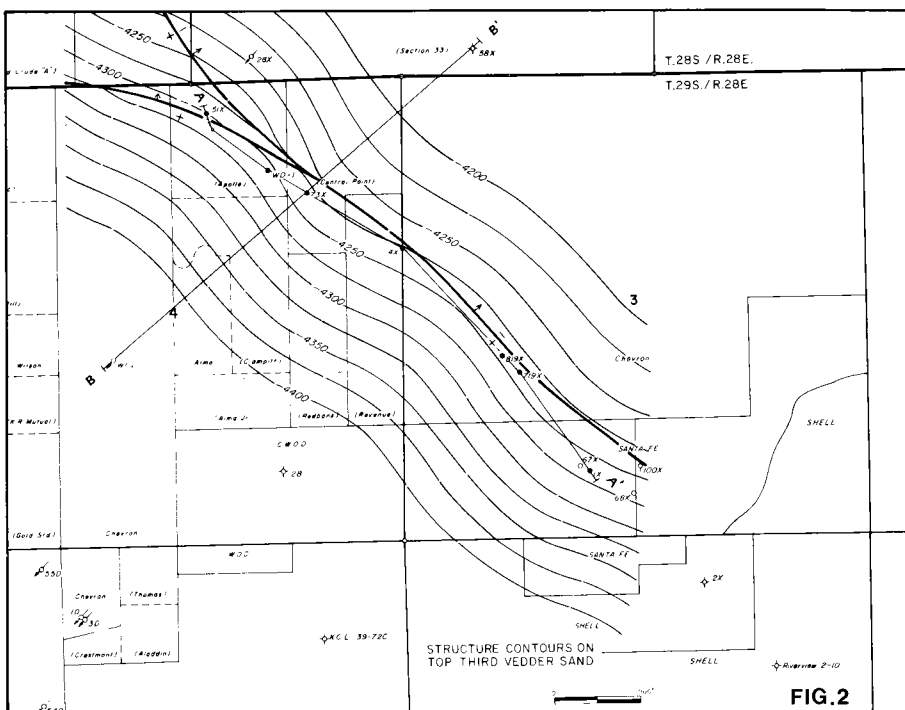
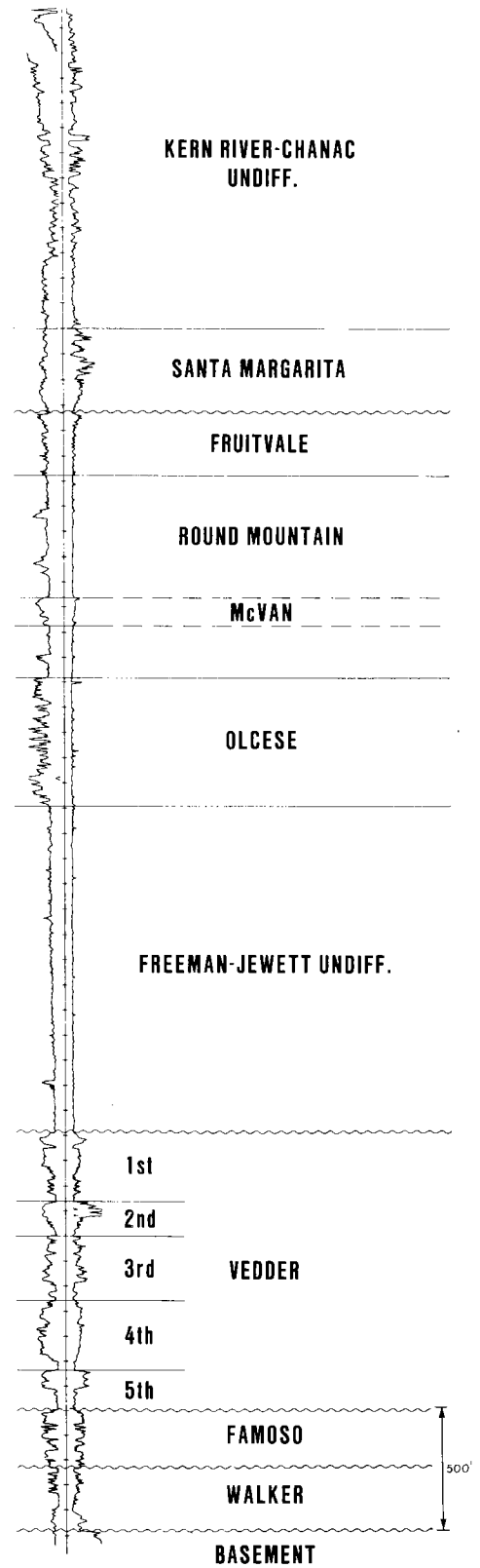


FIG. 1

FIG. 2

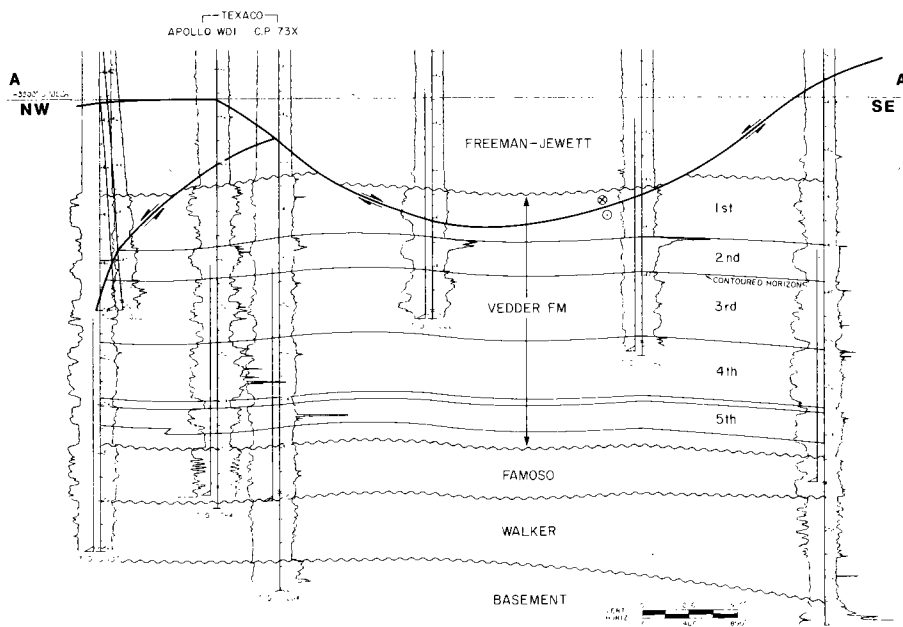


FIG.3

(Continued from page 3)

little indication of hydrocarbons; however, the mudlog did carry oil shows and a 240-unit gas kick at the top of the Third Vedder Sand. Twenty-six feet of interval was perforated in the third Vedder between 4881-4922 feet, and the well was put on pump for an initial production of 100 barrels of 40.5° and 200 MCF of gas per day.

Although Getty attempted to keep the new discovery secret, the presence of a large gas flare in the middle of the Kern River Field betrayed such efforts. Soon there was a relative explosion of drilling for Vedder production. From 1982 through 1985, 14 wells targeting the Vedder were drilled throughout Kern River by Texaco (Getty), Santa Fe, Chevron, Shell, and Nahama and Weagant. Approximately half have been completed as oil wells, extending production over one mile to the southeast along the fault (see Fig. 2).

Lateral confinement of the pool to the northwest is formed by a northward dipping normal fault with 30-40 feet of vertical displacement which intersects the main trapping fault near Apollo WD-1. This fault was discovered when Getty's Apollo 51X well cored the fault plane where the pay zone was anticipated. Apollo 51X was redrilled to the south and successfully completed as a producer within the Third Vedder Sand. This well has since been shut in due to mechanical problems.

The key follow-up well within this Vedder pool is Getty Oil Company's Central Point #73X, drilled in October of 1982. Located only 600 feet southeast of Apollo WD-1, this well was drilled to fulfill a lease offset obligation. In addition to the oil sands within the Third Vedder, C.P. #73X had excellent wireline, sidewall sample and mudlog shows within the Second Vedder Sand. The well was originally completed within the Third

Vedder, pumping 240 barrels of clean, 40.5° oil per day. Almost immediately, however, oil production in both Central Point #73X and Apollo WD-1 dropped dramatically, while water production increased. It was decided to recomplete Central Point #73X within the Second Vedder Sand. Upon perforating a 10-foot interval, 4731-41 feet, the packer blew out of the well and oil began spewing out over the location. Eleven hundred barrels of oil were shipped within 14 hours, with C.P. #73X becoming the Kern River Field's first gusher! The well was eventually completed, flowing 300 barrels of 32° oil and 1000 MCF of gas per day through a 16/64" choke.

Through June, 1986, Texaco's Vedder wells had produced approximately 300,000 barrels of oil and 370,000 MCF of gas combined from the Second and Third Vedder Sands. As of January, 1986, the last month for which data is available, 8 Vedder wells operated by 3 companies were producing a total of 508 barrels of oil and 250 MCF of gas per day. The relation of some of these wells and the productive sands is shown in Figure 3.

An interesting point to note in the Kern River Vedder pool is that oil has accumulated in the Second and Third Vedder Sands, not the First Vedder Sand as in Round Mountain. The trap is formed where faulting has dropped the impermeable silty zones of the base of one Vedder sand down against the productive zones of the underlying Vedder sand, as shown in Figure 4. Why the First Vedder Sand in Kern River, which appears to be the same sand that is productive in Round Mountain, does not produce oil is not yet understood.

The potential for discovering other such Vedder pools beneath and between the Kern River and Round Mountain fields is good. The Kern River Vedder pool and Santa Fe's apparent new Vedder discovery near the Kern Bluff Field are evidence of such potential. While such fields are not giants, they are economic. Of particular interest for exploration should be the lower Vedder sands, which remain virtually untested throughout the region. Of the more than 200 Vedder wells drilled between the Kern River and Round Mountain fields, only about 20 have been drilled below the First Vedder Sand, with only 6 of these having been drilled to basement. In addition to structural traps in the Vedder which have been drilled to date, the possibility of stratigraphic traps within the lower Vedder sands may exist where they pinchout or change facies laterally to the continental Walker Formation toward the east.

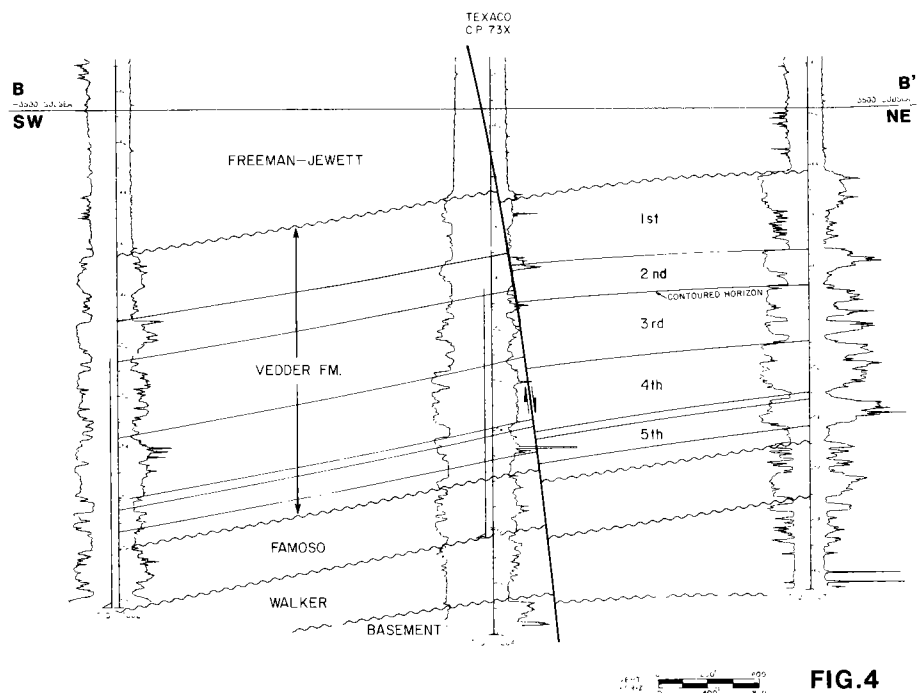


FIG.4

IN MEMORIAM

Robert M. Kleinpell

Robert Minssen Kleinpell, was born in Chicago, Illinois September 13, 1905 and passed away in Goleta, California March 13, 1986. He graduated from Occidental College in History and Geology in 1926; an MA and the PhD in 1934, from Stanford University, followed.

He was a field geologist for Richfield from 1928-31 and with the USGS 1931-34, and a consultant to various oil companies from 1934-39, including Richfield, General Petroleum and the Jergens Trust. He was also an interim Assistant Professor at Cal Tech between 1934-39. When employed in the Philippine Islands as a field geologist for the National Development Corporation, he was captured by the Japanese shortly after Pearl Harbor and spent the war years in the Santa Tomas and Los Baños prisons near Manila.

During those war years, prisoners with professional backgrounds organized a school for other internees. Dr. Kleinpell taught systematic biology and historic geology. There were no textbooks and a typical student would acquire many pages of class notes and detailed drawings of geologic strata as well as various invertebrate phyla. "Dr. Kleinpell had not a single note for reference and he repeated the performance without repeating the material for 40 weeks. A phenomenal tour de force of knowledge and memory.

In 1946 he joined the faculty of the University of California, Berkeley as Lecturer, Curator of the Micropaleontological Collections, Director of the Museum of Paleontology and was made full Professor of Geology and Paleontology in 1953. In addition, since 1946 he continued as a part-time consulting geologist and paleontologist to the petroleum industry.

Among Dr. Kleinpell's memorable achievements and contributions to the oil industry was the publication in 1938 of his book, "The Miocene Stratigraphy of California." This book, which rapidly became the "bible" of Miocene stratigraphy on the Pacific Coast, was revised and brought up to date in 1980 as "Miocene Stratigraphy of California Revisited." It was accompanied by "Criteria in Correlation: Relevant Principles of Science" a supplement which codified and stressed the often-neglected principles on which the conclusions of his Miocene Stratigraphy were based.

In addition to being an AAPG Distinguished Lecturer in 1960, "Doc" wrote numerous papers for GSA, the American Museum of Natural History, Paleontological Society of America and the Geographic Society of America. In each of these societies he held the rank of Fellow. Dr. Kleinpell was an Honorary Member of both AAPG and SEPM.

A measure of any professor's success may be assessed in terms of the number of his students who have achieved success following those basic principles learned from their mentor. By this yardstick "Doc" stands tall among his peers: a pioneer in biostatigraphic methods, possessor of an extraordinary intellect and ability to inspire, an understanding friend . . . these are the lasting and endearing qualities of Dr. Robert M. Kleinpell.

Robert N. Hacker

LOS ANGELES

Robert C. Michael - Ecology & Environment; Paul Robinson - Earthscan; Robert D. Edwards - MMS Pacific OCS Region.

Recent Moves

J. M. "Buzz" Delano, formerly with Schlumberger in Bakersfield to consulting. He will specialize in log analysis, offering logging program preparation, well site logging supervision and evaluation, and petrophysical analysis. Phone (805) 322-2584.

Coast

The officers for 1986/87 are:

President — Robert "Bob" A. Ballog
Vice Pres. — Kristi K. Morrison
Secretary — Christine L. Bathker
Treasurer — Terry Axtmann

San Joaquin

The San Joaquin Geologic Society officers for 1986/87 are:

President — Kenneth F. Hersh
Vice Pres. — Reinhard J. Suchsland
Secretary — Herman Schymiczek
Treasurer — Michael D. Cambell


SJGS will host its annual fall BBQ, Tennis, and Gold tournament Friday, September 12, 1986. The BBQ will be held at the Bakersfield Police Department Pistol Range (Truxtun Ave. at Westwind). Happy hour, horse shoes, and volleyball start at 5 PM, dinner at 6 PM. Tickets are \$12 prepaid or \$14 at the gate. Prepayment should be made to SJGS BBQ at P.O. Box 1056, Bakersfield, CA 93302. The tennis tournament will be held at the Laurel Glen Tennis Club, 6901 Ming Ave., Bakersfield, starting at 9 AM. A \$15 entrance fee, which includes lunch is required and must be received by the September 5 deadline. To enter send your check to SJGS Tennis, P.O. Box 1056, Bakersfield, CA 93302. For additional information contact J. M. "Buzz" Delano (805) 323-2584. Tee off time for the golf tournament is set for 8 AM, at the Kern River Golf Course, east of Bakersfield. The entrance fee, which includes lunch, is \$15 (carts are extra), and should be mailed to SJGS Golf, P.O. Box 1056, Bakersfield, CA 93302, before the September 5 deadline. For additional information contact E. B. "Woody" Harris (805) 833-1952.

Northwest

The Northwest Petroleum Association officers for 1986/87 are:

President — Charles E. Stinson
Vice Pres. — R. E. "Andy" Corcoran
Secretary — Richard G. Bowen
Treasurer — Dennis Olmstead

Packets from the NWP's May 15-16, 1986 Olympia Symposium are now available for \$5. These contain all the program abstracts as well as the field trip guide. Send your name, address, and check to: Richard G. Bowen, Northwest Oil Report, 825 N.W. Albemarle Terrace, Portland, OR 97210.



Alan R. Hershey
Consulting Geologist
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Caveat Emptor

Recently the Classified or help wanted sections of the popular press and some industry publications have carried advertisements for "Overseas Employment." Often these ads suggest that applicants will be able to earn very high salaries with generous benefits, travel expenses, etc. However all too often respondents find that after all the rosy picture painting is finished they will be asked "send us (usually several hundred dollars) for your (usually six months) **subscription** to our computerized job hot line".

In many cases all that is being sold is a list of companies with overseas operations, because the "employment service" has no direct knowledge that any of the listed potential employers currently has a job opening.

The preceding is a synopsis of a warning issued by the Better Business Bureaus (BBB) of Los Angeles/Orange, Kern, Kings and Tulare Counties recently in an open letter directed at the oil and related service industries.

Employment agencies in California must be licensed by California's State Department of Consumer Affairs, Bureau of Personnel Services. Every employment agency contract must contain the statement: "This agency is licensed by the Bureau of Personnel Services of the State of California, 1333 Howe Avenue, Sacramento, California. Inquiries concerning your contract may be sent to this address."

Prepaid computer employment agencies are allowed to charge an advance fee for this
(Continued on page 6)

Surviving In Today's Oil World

(Continued from page 5)

computer matching service. The consumer's advance fee is somewhat protected by California law, as follows:

1. The agency must refund the advance fee, in full, if the agency does not, within five days after execution of the contract, supply at least three employment opportunities then available to the job seeker and meeting the specifications of the contract. Contracts for prepaid computer employment agencies must contain the following information about the type of employment the job seeker is seeking: a) Type of job; b) Interests of job seeker; c) Qualifications of job seeker; d) Salary, benefits, and other conditions of employment; e) Location of job. The BBB suggests this information be as specific as possible from the job seeker, as these specifications may be used later to determine if the agency has fulfilled its part of the contract, which requires that matches made by the agency meet the requirements of the job seeker. It should be noted that a prepaid computer employment agency is not required by law to inform the job seeker of the matches made for him or her; however, the job seeker may request the Bureau of Personnel Services to verify that the agency has been taking appropriate action on behalf of the job seeker.

2. The agency shall refund any fees paid, except for a \$25.00 service charge, to the job seeker if the job seeker fails to obtain a job through the computer matching services of the agency. Contracts for prepaid computer employment agencies are limited to a 90-day term.

3. Some prepaid computer employment agencies offer additional fees; however, the agency cannot require that job seekers purchase any additional services in order to purchase the agency's computer matching service.

The BBB recommends that individuals interested in contracting with a prepaid computer employment agency contact the Bureau of Personnel Services.

The Education Department of the AAPG has recently offered two audio cassette programs: *What To Do When the Bottom Drops Out*, and *The Business of Being a Petroleum Independent*, in an effort to aid those suffering from what president Bruno Hanson calls R.A.I.D.S. (Recently Acquired Income Deficiency Syndrome).

The first of these was recorded March 7, 1986 in Houston, at a seminar sponsored by the Houston Geological Society and the Geophysical Society of Houston. Included among the speakers are: moderator Mac McKinney; Robert Megill, consultant; Toyce Anderson, Crown Central; Sarah Stanley, Texas Gas Exploration; Richard Hoffman, Johnson O'Connor Research; Bill Morin, Drake Beam and Morin; Ira McNeil, Texas Employment Commission; and James O. Lewis, Retama Oil Corporation. Topics range from Organizing Your Job Search and Finding One's Innate Skills to discussion on Today's Employment Market.

The second program was recorded February 21, 1986, in Houston, at a seminar sponsored by the Society of Independent Professional Earth Scientists. It consists of personal "case histories" presented by several petroleum independents, as well as their advice on becoming an independent, from outfitting an office to legal ramifications to the pitfalls of being on one's own. The faculty includes: John Burns, President of the local SIPES chapter; Elwin Peacock, Elwin M. Peacock Inc.; James O. Lewis, Retama Oil Corporation; Hank Bauerlein, independent geologist; Clyde Harrison, independent geologist; Barry Van Sandt, Van Sandt and Associates, Inc.; Sam Finn, independent geophysicist; Jack Colle and Associates; Ed Warren, independent geologist; Al Wadsworth, Jr., Wadsworth Oil Co.; and Robert Ledger, consulting geologist. The question and answer session from the seminar has been transcribed and is provided in addition to the cassette. Both programs are 4½ hours in length and fill 3 double-sided casset-

tes each, and have been subsidized by the AAPG Foundation. Their support allows the Association to offer them to members for \$8 each (North America) and \$10 (export). A third program, *Survival Strategies* is in production and should be available by August. *Survival Strategies*, recorded May 28, 1986, in Midland at a Seminar sponsored by the Permian Basin Graduate Center will be offered at the same price as the presently available programs. To order these programs contact: AAPG Bookstore, P.O. Box 979, Tulsa, OK 74101-0979 USA. Add \$6 for air parcel delivery or \$2.25 for surface parcel delivery.

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NEWSLETTER
Pacific Section A.A.P.G.
 P.O. Box 1072
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**FIRST
CLASS**



PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

of the Pacific Section
American Association of Petroleum Geologists

AUGUST/SEPTEMBER 1986 NO. 5

President's Corner . . .

At this time I would like to comment on some of the items discussed at the Executive Committee meeting held September 16, 1986 in UNOCAL's Ventura office. During the past year Lucy Birdsall scheduled a number of bi-monthly Committee meetings to coincide with the monthly meeting date of some of our regional groups such as the Coast, Los Angeles Basin and San Joaquin Geological Societies. This has worked out very well and I plan on continuing the practice. It allows the membership of the Societies to meet the elected officers of the Section and, importantly, listen and discuss with the local members any questions or concerns either may have.

In my column last month I mentioned the importance the Section places on the current job situation for geoscientists. I have appointed a Committee under the chairmanship of Dan Pasquini plus two members, Jack H. West and Bob Nesbit. They will review and coordinate this vital problem with the National AAPG and other Section Societies. The results of their findings will be discussed in future issues of this Newsletter.

I am very pleased to announce that Jack Cunningham, Exploration Manager for Celetron Oil and Gas Corp. in Santa Barbara has accepted Chairmanship of the 1988 Pacific Section regional meeting. It will be held in the Ventura area and Jack is now busy finalizing location and dates for the meeting. Jack will be contacting members for Committee assignments in the coming months. Because the National AAPG meeting will be in Los Angeles in 1987, there will not be a Pacific Section meeting next year. As host Section for the National meeting, we will sponsor 3 pre-meeting field trips and 1 post-meeting field trip plus 2 short courses. The theme of the meeting is "LA's the Place" and the dates are June 7-10. As I noted last month - Plan now to attend!
ROBERT LINDBLOM

Interior Publishes OCS Reserves Estimate

The U.S. Department of the Interior Mineral Management Service (MMS) issued OCS Report MMS 86-0066, Estimated Oil and Gas Reserves Pacific Outer Continental Shelf (as of December 31, 1985) in June 1986.

This study, authored by Pacific Section members Peter J. Raftery and Steven A. Wolfson, estimates the remaining recoverable reserves of oil and gas in the Pacific Outer Continental Shelf (POCS) at 1,259 million barrels of oil and 2,067 Bcf of gas. These reserves are attributed to 24 fields. Original recoverable reserves from these fields are estimated at 1,599 million barrels and 2,334 Bcf. The estimates for remaining and original recoverable reserves of oil are higher, and those for gas are lower than the corresponding estimates for 1984 (Table 1). This is primarily due to the inclusion of estimates for a recently discovered field and the refinement of estimates for several other fields.

Reserve estimates for: Dos Cuadras, Carpinteria Offshore and Hueneme were made from volumetric and decline-curve analysis. Individual reservoirs in these fields were grouped for volumetric calculations. Decline-curve analyses were made on a lease-by-lease and platform basis. The remaining fields were studied on a reservoir-by-reservoir basis and the reserve estimates were determined by the volumetric method.

Two of the 24 fields, in the POCS considered as producing or capable of production, are gas fields, 14 are oil fields and eight are combination oil and gas. Those fields that cover both State and Federal lands have reserves estimated for only the Federal portions, seaward of the three-geographical-mile line. Seven of the 24 POCS fields: Hondo, Dos Cuadras, Carpinteria Offshore, Pitas Point, Santa Clara, Hueneme, and Beta, were producing at years end in 1985. Of these only four: Dos Cuadras, Carpinteria Offshore, Pitas Point and Hueneme, have completed their drilling programs. Additional exploratory and delineation drilling is anticipated in many of the remaining fields to further define productive limits and provide effective development. Several fields are expected to begin production in the near future. For example: Point Pedernales will commence sustained production late in 1986, and startup of initial production from Point Arguello is expected a year later.


Therefore, it seems clear that, with less than 30% of the POCS fields drilled up, future MMS oil reserve estimates for the POCS will continue the upward trend of the past ten years. (Table 2)

	OIL (million bbl)	GAS (billion ft ³)
Original reserves:		
Estimated as of 12/31/85 (this report)	1,599	2,334
Estimated as of 12/31/84 (MMS 85-0041)	1,515	2,400
Change	+ 84	- 66
Cumulative production:		
Through 1985	340	267
Through 1984	310	202
Remaining reserves:		
Estimated as of 12/31/85 (this report)	1,259	2,067
Estimated as of 12/31/84 (MMS 85-0041)	1,205	2,198
Change	+ 54	- 131

Table 1: Estimated demonstrated oil and gas reserves for 24 fields, Pacific Outer Continental Shelf, December 31, 1985.

("Oil" includes crude oil, condensate, and gas-plant products sold. "Gas" includes both associated and nonassociated dry gas.)

(Continued on page 2)



Alan R. Hershey
Consulting Geologist

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(Continued from page 1)

YEAR	PUBLICATION	OIL (MMBBL)	GAS (MMCF)
1976	OFR 78-384	829	1530
1977	OFR 79-345	843	1546
1978	OFR 80-477	875	1665
1979	OFR 80-1042	920	1845
1980	OFR 81-623	988	1853
1981	OFR 82-37	1082	1847
1982	OFR 83-559	1217	1983
1983	MMS 84-0024	1433	2298
1984	MMS 85-0041	1515	2400
1985	This Report	1599	2334

Table 2: Annual estimates of original recoverable reserves with publication identification numbers.

CALCRUST To Shoot Profile Across Tehachapi Mountains

CALCRUST (California Consortium for Crustal Studies) is planning a deep crustal seismic profile across the Tehachapi Mountains, connecting the southern San Joaquin Valley and the northwestern Mojave Desert. Beginning October 15, CALCRUST, which is funded by the National Science Foundation, will begin the northern portion of this survey starting north of the White Wolf Fault, southwest of Arvin, to Lopez Flats in the Tehachapi Mountains, following roads along Comanche Point and ascending the mountains along El Paso Canyon. Western Geophysical has been selected as contractor for this line, whose route is shown schematically in figure 1.

A deep seismic profile across the narrow 'waist' of the Tehachapi Mountains has never been attempted but has been a high priority of California geoscientists for many years. Existing geologic and geophysical data suggest that the Tehachapi Mountains have been significantly uplifted, translated, and rotated (up to 60 degrees) in Cenozoic time. The exact timing of, and the structural features involved in this tectonism have not been established. The goal of this CALCRUST project is to unravel the geologic/tectonic history of the Tehachapi Mountains and surrounding terranes by incorporating new and old seismic reflection, surface and subsurface geologic, paleomagnetic and laboratory data to produce an integrated study.

Data will be acquired using a 400-channel MDS-16 Fibre Optic recording system with six LRS 315 vibrators as an energy source. To complement the vibrator data, several long offset (40 km) dynamite shots will be recorded to acquire wide-angle and critical-point reflection data from the lower crust and Moho. Major acquisition problems include steeply dipping near-surface and basement layers and the steep Tehachapi Mountain terrain. Data acquired will be processed by CALCRUST using industry-standard software programs.

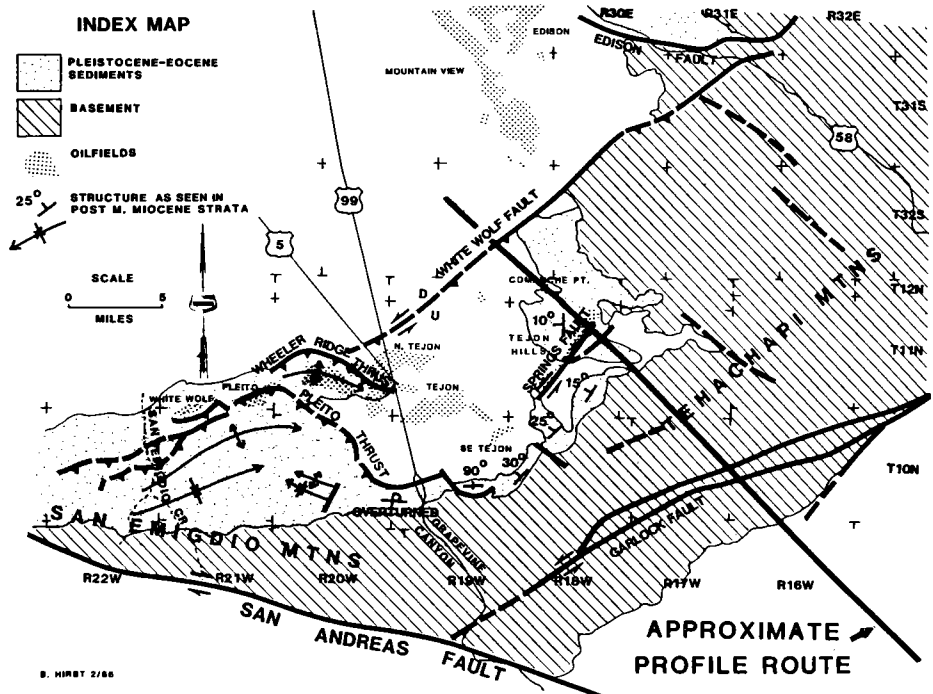


FIGURE 1: Index map of Tejon and adjacent areas showing basement and sediment outcrop, faults and structure developed by Pliocene to recent tectonism as seen on post middle Miocene strata. (from B. Hirst 1986)

GEOLOGIC TARGETS

Known geologic targets include: **Garlock Fault**, a 260 km long, left-lateral fault that trends east-northeast through the Tehachapi Mountains into the Mojave Desert. This fault has left-lateral displacement of some 60 km and is significant in that it locally separates the exposed, deep crustal igneous and metamorphic terranes of the northern Tehachapi Mountains from the shallow granitic terrane to the south.

Between the north and south branches of the Garlock lie the **Pelona Schist**, an active margin/subduction-related complex with deep marine sedimentary and volcanic rock protoliths. Identification of the structure and type of crust underlying the Pelona is one of the goals of this survey.

The crystalline rock of the western **Tehachapi Mountains** primarily consists of tonalite and tonalite gneiss and may represent crustal levels as deep as 27 km, probably the deepest exposed levels of the Sierra Nevada batholith. It is hoped that this survey will provide a clearer picture of the "roots" of these mountains.

The **Tejon Embayment**, a northwest-plunging trough is considered to have been relatively stable compared to the ultra-deep **Maricopa Sub-Basin**, north of the White Wolf Fault, which contains up to 12 km of sediment. The structure of the Tejon Embayment is dominated by major normal faulting involving Tertiary as well as basement rocks and is coincided with and postdates a major Saucanian volcanic episode. Data from industry seismic lines reveal Pliocene to Recent thrust faulting as the mountain front is approached.

Finally, CALCRUST will attempt to image at depth the enigmatic **White Wolf Fault**, site of the 1952 Kern County earthquake. Basement offset across this fault exceeds 4.5 km. The White Wolf has been described either as a normal, growth fault with a Recent reverse component, as a series of southeast-dipping thrust faults, or as an oblique-slip fault. The White Wolf is largely buried west of Comanche Point.

It is the intention of the principal investigators — Peter Malin and Emery Goodman of the University of California Santa Barbara — to make the CALCRUST data available at a nominal charge after brute stack processing is completed, i.e. in 3 to 6 months. Anyone, either in industry, or at universities having seismic data sets, VSP data, subsurface basement maps, or other relevant data that CALCRUST can use in their research, please contact Peter Malin or Emery Goodman at (805) 961-3520. Field tapes, suitable for re-processing to enhance the basement portion, of seismic record sections near the CALCRUST survey are of particular interest. Several companies have already loaned data to CALCRUST for research purposes; such data is kept strictly confidential.

New Members

COAST

Emery D. Goodman — CALCRUST, UCSB.

LOS ANGELES

Richard McKenney — Schlumberger, Signal Hill.

NORTHERN CALIFORNIA

John K. Cassel; Robert E. Kropschot.

Recent Moves

ALASKA

Diane Phillips from Anchorage to San Anselmo, Calif.; **Thomas Wilson Jr.** from Anchorage to Goleta, Calif.; **Becky A. Watson** from Bakersfield to Anchorage.

COAST

Michael Mulhern from Schlumberger to ResTech, Ventura.

LOS ANGELES

Fred W. Bergen Jr. from Houston to Carlsbad, Calif.; **Edward Marks** from UNOCAL to Green, Marks & Associates, Whittier; **John A. Packard** from Union of Great Britain to Los Angeles.

NORTHWEST

Leslie M. Ekas from Bakersfield to Seattle.

SACRAMENTO

William J. Hunter formerly with Harold J. Bertholf, Inc. to Willima J. Hunter & Associates, specializing in oil, gas, and mineral properties evaluation (916) 972-7941 in Sacramento.

SAN JOAQUIN

Laura & William Bazeley, and **William K. Dahleen** from ARCO, Plano, Texas to ARCO, Bakersfield.

OTHER STATES

Fredrick S. Reid Jr. from Phillips, Denver to FSR Associates, Englewood, Colo.; **Bevan W. Alwin** from Exxon Thousands Oaks, Calif. to Houston.

Recent Retirees

COAST

Al A. Almgren, **G. C. "Butch" Brown**, **William C. Goth**, **Edward A. Hall**, **Arthur V. Lewis**, **Raymond E. Malloy**, **Tom W. Redin**, and **Robert S. Wilton** all from UNOCAL Ventura; **Myron C. Metz** from UNOCAL Santa Maria.

LOS ANGELES

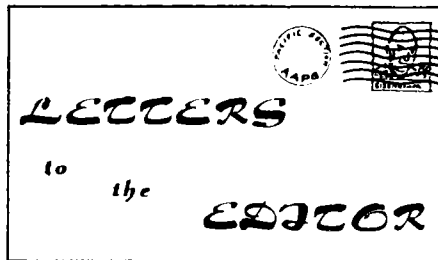
Chih Shan Chen from UNOCAL Research, Brea; **George B. Pichel**, **Kennith Fox** from UNOCAL, Los Angeles.

Coast

Floyd Sabins, Chevron Research, will present "New Developments in Remote Sensing in Geology" at the November 18 meeting of the Coast Geological Society.

The meeting will be at the American Legion Hall — 83 So. Palm Street, Ventura. Social hour at 6, dinner at 7, for additional information and reservations call: Sandi Leiper at (805) 656-7600, Ext. 192.

EDITOR'S NOTE: The address for **Argonaut Oil and Gas**, and its geologists Jack Clare and James O'Neill in the 1986-87 Directory is incorrect. The correct address is: P.O. Box 1832, Bakersfield, CA 93302.



Dear Editor:

I would like to clear up an error that showed up in the last PPG Newsletter. For your information the officers of the SJGS are as follows:

<i>President</i>	Kenneth F. Hersh
<i>President-elect</i>	Reinhard J. Suchsland
<i>Vice-President</i>	Herman Schymiczek
<i>Treasurer</i>	Michael D. Campbell
<i>Secretary</i>	Robert Horton

Very truly yours,

Reinhard J. Suchsland

Nevada's First Commercial Geothermal Plant Dedicated

Beowawe Geothermal Project, Nevada's first commercial geothermal-powered electric generating plant was dedicated August 30, 1986. The \$25 million facility, owned by the Beowawe Geothermal Power Company, whose co-partners are **Chevron** Geothermal Company of California and Crescent Valley Energy Company, is located in Wirlwind Valley some 60 miles southwest of Elko.

Since the 50's, thirteen exploratory wells have been drilled in the Beowawe Geysers area by various energy companies including Vulcan Energy, Magma Power Co., and Chevron. Two of Chevron's 7000'-10,000' wells will supply 100,000 B/D of 400°+ Fahrenheit, 1200 ppm total dissolved solids, geothermal fluid to the plant. A third well, 1.8 miles from the plant will be utilized for injection of excess fluids.

The plant uses a double flash system to produce and separate enough steam to generate 16.6 megawatts of electricity. Steam exiting the turbine is condensed by cooling towers, and this condensate is used as make-up water for the towers. Excess condensed water and spent geothermal fluid are piped 1.8 miles to an injection well, and returned to the reservoir.

Plant operations, including spent fluid injection, require about 1.6 megawatts of the output giving the Beowawe project a net output of 15 megawatts. An equivalent sized oil fired generating facility would consume approximately 150,000 B/Yr.

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Pacific Section AAPG Membership Report

September 6, 1986

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY

Active (GA-SF)	95
Subscriber (GS-SF)	10
Honorary	<u>3</u>

108

SACRAMENTO PETROLEUM ASSOCIATION

Active	34
Subscriber (GS-SC)	<u>16</u>
	50

SAN JOAQUIN GEOLOGICAL SOCIETY

Active (FA)	198
Subscriber	49
Honorary	<u>3</u>

250

COAST GEOLOGICAL SOCIETY

Active (EA)	127
Subscriber (ES)	23
Honorary	<u>3</u>

153

LOS ANGELES BASIN GEOLOGICAL SOCIETY

Active (DA)	215
Subscriber (DS)	35
Honorary	<u>13</u>

263

NORTHWEST PETROLEUM ASSOCIATION

Active (BA-NW)	26
Subscriber (BS-NW)	<u>9</u>
	35

ALASKA GEOLOGICAL SOCIETY

Active (BA-AK)	20
Subscriber (BS-AK)	<u>1</u>
	21

OTHERS

Active (BA-OS)	5
Active (BA-US)	117
Subscriber (BS-US)	<u>10</u>
	132

TOTAL 1986-1987

PAID MEMBERSHIP	985
Honorary Membership	<u>22</u>

TOTAL PAC. SEC.

MEMBERSHIP 1007*

* This is nearly 250 (19.5%) lower than Dec. 85. Delinquent Notices will be mailed in Oct., so check your mail or your check stubs to make sure you've joined Pacific Section this year.

**PPG DEADLINE
for OCT./NOV. ISSUE
NOVEMBER 21**

Mist Area Lease Sale

On July 28, Columbia County, Oregon finally held its long-awaited lease sale in the Mist area. Of the 292 tracts offered, 76 received bids for a bonus to the county of \$134,000.

Diamond Shamrock has returned to the area after selling their interest to ARCO in late 1985. ARCO was active during the sale in picking up tracts they needed to complete some drilling blocks, and paid the high price of the sale, \$70.00/acre, for sec. 34, T. 6 N., R. 5 W. Two landmen were active in picking up large tracts; Ed. Dunn of Parker, Colo., concentrating on the north side of the area, obtained 5601 acres, nearly all at 50¢/acre. David Fadley of Mays and Assocs., Ellensburg, Wash., picked up a large amount of acreage, mainly east of the Mist field, mostly at 50¢/acre.

In summary, it would appear that ARCO is still interested in continuing its development of the area, and things look good enough to Diamond Shamrock for them to return. The large blocks assembled by Dunn and Mays indicates that someone is planning a new exploration program in that part of Columbia County or are completing drilling blocks.

From the Northwest Oil Report

Reader's Corner

Cased-Hole Log Analysis and Reservoir Performance Monitoring, by R.M. Bateman (1985). International Human Resources Development Corp. \$58.

Practical Petroleum Geology, by J. Morris, R. House, and A. Mcann-Baker (1985). Petroleum Extension Service, University of Texas at Austin, Balcones Research Center. Bldg. 2, 10100 Burnet Road, Austin, TX 78758-4497. No price given.

Summary geologic report for petroleum lease sale 100, Kodiak Shelf, Alaska, by M.A. Fisher, Roland Von Huene, and M.A. Hampton. USGS Open File Report OF 84-0024. Paper copy \$14.75.

Analysis of seismic reflection lines over Pacific convergent margins, by J.J. Miller, and Roland Von Huene, and

Regional correlation sections across the North Slope of Alaska, by C.M. Molenaar, K.J. Bird, and T.S. Collett, and

Borehole geophysical applications in the characterization of geothermal energy resources, by F.L. Paillet, R.H. Morin, and W.S. Keys, and

The Shublik Formation; a model for deposition in an ancient upwelling zone, by J.T. Parrish, and

Classification of clastic reservoirs for enhanced oil recovery, by C.J. Schenk, J.W. Schmoker, and D.L. Gautier, and

Tectonics; a first-order control of sediment distribution and hydrocarbon potential; examples from the western margin of North America, by T.J. Wiley, and

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Miocene Planktonic Foraminiferal Biogeography and Paleocceanographic Development of the Indo-Pacific Region (1985), Memoir-Geological Society of America, V. 163.

A Fan Dam for Tulare Lake, California, and Implications for the Wisconsin Glacial History of the Sierra Nevada, by B.F. Atwater et.al. (1986). Geological Society of America Bulletin, V. 97, No. 1.

Dictionary of Rocks, by R.S. Mitchell (1985). Van Norstrand Reinhold Co., Inc., \$29.95.

Formation Evaluation: Geological Procedures, edited by A. Whittaker (1985). No price given.*

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ration for Fossil Fuels, by G. deVries Klein (1985). \$57, (\$65 outside US)*

Vertical Seismic Profiling: Technique, Applications, and Case Histories, by A.H. Balch and M.W. Lee (1984). \$58 (cloth)*

* All published by International Human Resources Development Corp., 1377 Newbury Street, Boston, Mass. 02116.

Storm Depositional Systems: Dynamic Stratigraphy in Modern and Ancient Shallow Marine Sequences, by T. Aigner (1985). Springer-Verlag, \$14.50.

Reservoir Sandstones, by Robert R. Berg (1986). Prentice-Hall Inc., \$35.95.

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PUBLICATIONS COMMITTEE: Pacific Section American Association of Petroleum Geologists, P.O. Box 631, Ventura, CA 93002.

NEWSLETTER
Pacific Section A.A.P.G.
P.O. Box 1072
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FIRST
CLASS



PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

of the Pacific Section

American Association of Petroleum Geologists

OCTOBER/NOVEMBER 1986 NO. 6

President's Corner . . .

Any significant accomplishments the President of the Section may have during his term is due largely to the work of the various standing Committees of the Section. At this time, I would like to say a few words on the Committee of Publications whose Chairman is Hans Schwing. Hans is a development geologist for UNOCAL in their Ventura office and has been Chairman of the Committee since 1983. The primary function of the Committee is to assist in securing material for publication and sale by the Section. It also arranges for joint publishing of material from other affiliated Societies of the Section. The work of this Committee is important not only in publishing articles, field trip guidebooks and other material of interest to geoscientists, but also its financial impact to the Section from sales is significant.

The current inventory of publications is \$35,000 and annual sales through mail order, Section and National meetings and monthly local Society meetings may total over \$10,000. Hans has done an excellent job as Chairman and the Section is fortunate to have his concern and expertise on this Committee. In future Newsletters, I will discuss the work of other Committees.

The Executive Committee meeting was held November 20, 1986 in Los Angeles following the Los Angeles Basin Geological Society luncheon meeting. Both meetings were well attended. The initial planning for the 1988 Section meeting in Ventura is moving very well and a firm date and place will be announced by February. Final abstracts of the field trips (4) and short courses (2) the Section will sponsor at the National meeting in June have been submitted to AAPG in Tulsa.

On behalf of the Executive Committee, I would like to wish all of you a very happy and safe Holiday Season!

ROBERT LINDBLUM

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Elk Hills Well Heads For Record

The Department of Energy (DOE) with Bechtel Petroleum as contractor is drilling DOE's No. 934-29R. This, purposed 25,000' test in section 29 T30,R23E of Kern County's Elk Hills field was spud May 30, 1985 by Parker Drilling Co.'s Rig No. 182. If the well goes as deep as programmed it will set a new depth record for California. The present record holder is Tenneco's Tenneco-Superior-Sandhills No. 64x, which was abandoned in 1976 at 22,711', 25 miles southeast of the Elk Hills field. The deepest hole to date in the Elk Hills field is DOE's 18,761', No. 987-25R, 4½ miles east of 934-29R.

Production from Elk Hills, like almost every other field, has declined over the last two years. At the beginning of 1986 it stood at 121,908 B/d. By June it had fallen to 99,229 B/d and the June-July average showed the largest single decline in average daily production in a California field of 1644 B/d.

Most of Elk Hills' oil occurs in the Stevens sands (Miocene) at average depths ranging from 5,900' to 8,900', with some deeper production from the Caneros pool (Miocene) at an average depth of 9,300' and the Agua pool (Oligocene) at an average depth of 9,500'. Among the targets for the wildcat are the Phacoides, Oceanic and Point of Rocks sands.

To date the Parker crews have: set and cemented 16" casing at 8,798' recorded a gas kick at 17,426', and set and cemented 10¾" casing at 17,400'.

P.I. Moves Logs To Texas

The log files formerly housed in Bakersfield by Petroleum Information have been moved to Houston.

Pacific Section member Bill Thompson, manager of West Coast Well Log Service in Bakersfield, said, "All our files have been shipped to Houston. However, I'll still take orders in Bakersfield, either over-the-counter or by phone, and forward them to Texas. Customers can also call Houston to place orders at (713) 871-1974 or (713) 961-6550, plus a toll free line through Bakersfield is planned in January."

History Volume Goes To Press

The latest publication of the Pacific Section, *History of the Pacific Section*, went to press in December. Covering the 62 year history, from 1924 to 1985, of the Section this volume highlights every aspect of the Section's activities.

Topics such as: the early years, the war years, some important discoveries, technical developments, S.E.P.M., S.E.G., and local societies, plus reminiscences and anecdotes are detailed by the more than 30 authors who's names read like a who's who of the section.

Copies may be obtained from the publications committee, P.O. Box 631, Ventura, CA 93002, for \$14.50

Registration Board Members Elected

Mr. Howard A. Spellman, Jr., was elected president of the Board of Registration for Geologists and Geophysicists for 1986/87 at the July meeting. He is vice president/geology manager for Converse Consultants in Pasadena. Mr. Spellman is a member of the Association of Engineering Geologists, American Institute of Professional Geologists and Geological Society of America. He served as president of the Association of Engineering Geologists in 1978. Governor George Deukmejian appointed him to the board in July 1985.

Mr. Wayne Bartholomew was elected vice president of the board. He is a public member who was appointed by Governor Deukmejian in 1985. Mr. Bartholomew is a business and health consultant in Elk Grove, CA.

Mr. Joe Crosby was reappointed in July 1986 to a full term as a public member by Governor Deukmejian. Mr. Crosby is vice chairman of the board of the First Arroyo Bank of Pasadena.

Mr. William B. Snyder, of Whittier, CA, was appointed in July 1986 to a public member position on the board by Governor Deukmejian. Mr. Snyder was director of sales for oil refinery engineering and construction of Hobbs-Bannerman Co. in Santa Fe Springs until he retired in 1984.

Alaska

The Alaska Geological Society is very much alive and well, although our ranks have thinned slightly since last year at this time. To all visitors and newcomers to the geological community Alaska, we would like to extend a hearty welcome to our monthly meetings and an invitation to become a member. We also welcome the many of you living in the "Lower 48" who are working on Alaska projects or just interested in keeping abreast of geological happenings in our great state. Membership applications are available by writing to the AGS at Box 101288, Anchorage, Alaska 99510. As a quick update, this year's slate of officers and directors reads as follows:

- President George Stadnicky
- Vice President Bill Pyle
- Secretary Barbara Bascle
- Treasurer Chick Underwood
- President-Elect Naresh Kumar
- Director Doug Dickey
- Director Mary Bannister
- Director Tom Miller
- Director Helen Hankins

With the end of the summer field season (or in the case of many "fishing season"), and our annual fall barbecue behind us, AGS members are making plans for an active and interesting year of monthly meetings, presentations, short-courses and especially, our May, 1987 *AGS Symposium on Geological Hazards*. The Symposium will be held *May 12 through May 17, 1987* at the *Anchorage Hilton Hotel*. Presentations will cover a wide range of topics of interest to many including: *earthquakes* (landslides, faults, tsunamis), *hydrologic hazards* (aufeis, water supply problems, septic fields, avalanches, floods), *volcanos* (lahars, ash flows), *shallow drilling hazards* and *construction problems* (permafrost, gas hydrates, slope stability and settlement). A field trip is planned to the Portage Glacier Visitors Center. The Park Service will present their movie and brief lecture and several speakers will make presentations on glaciers, including the recent surging of the Hubbard Glacier.

Northwest

The Oregon Dept. of Geology and Mineral Industries is preparing two bills to introduce to the 1987 session of the legislature. The first bill provides a civil penalty for violations of laws regulating the drilling for oil and gas. At present there is no civil penalty, and no way to recover costs for problems in excess of coverage by a bond. Such civil action would be used only in cases of severe dam-

age or pollution where the bond was inappropriate or inadequate. The proposed top limit would be \$10,000 per day. The bill would also make subject to dismissal any employee of DOGAMI who discloses confidential oil and gas well data.

The second oil and gas bill provides for the confidentiality of certain geological and geophysical surveys conducted on submerged and submersible State lands. This year, the Division of State Lands wrote rules to govern offshore (to 3 miles) geological and geophysical surveys for oil and gas exploration. The data generated by such surveys would be housed by DOGAMI. This bill would protect the data from release to the public for a period of 10 years. This bill would also make subject to dismissal any DOGAMI employee who discloses this offshore data.

Any questions or comments about the bills should be directed to Dennis Olmstead at DOGAMI, (503) 229-5580.

A comprehensive bibliography of the ocean floor off Oregon and of the adjacent continental margin has been released by the Oregon Department of Geology and Mineral Industries (DOGAMI). The new release is published as a colored map with text printed on both front and back of the sheet. Entitled *Geologic Bibliography and Index maps of the Ocean Floor off Oregon and the Adjacent Continental Margin*, it is map GMS-39 in DOGAMI's Geological Map Series.

The new publication is the first such bibliography ever produced. It is part of the efforts by State and Federal research teams investigating the newly expanded offshore areas under United States jurisdiction proclaimed in 1983 as the Exclusive Economic Zone (EEZ). It was produced through the joint efforts of the U.S. Minerals Management Service (MMS), the College of Oceanography of Oregon State University, and DOGAMI. The authors were OSU marine geologists C. P. Peterson and L. D. Kulm and DOGAMI staff geologist J. J. Gray. Major funding was provided by MMS.

The bibliography is correlated with two index maps (scales 1:1,000,000 and 1:2,000,000) on which specific studies are outlined in seven colors on a bathymetric/topographic base. A subject index makes the references accessible under specific topics.

DOGAMI map GMS-39, is now available at the Oregon Department of Geology and Mineral Industries, 910 State Office Building, 1400 SW Fifth Avenue, Portland, Oregon 97201-5530. The purchase price is \$5. Orders under \$50 require prepayment.

**PPG DEADLINE
for DEC./JAN. ISSUE
JANUARY 23**

New Members

Coast

Yvan J. Beausoliel - Chevron; John Cunniff - Conoco; Carl Helms, Jr., Ventura; Robert S. Macalister - Camarillo; Frederick M. Nelligan - URS Corp., Santa Barbara; David A. Selby - Ventura; Randall Stashonsky - Exxon, Ventura; Marc Yeley - Dresser-Atlas, Ventura.

Los Angeles

George N. Yeckl - Mission Viejo; Amy L. Young - Long Beach Dept. Oil Properties.

Northern California

David H. Glenn - Chevron, San Ramon; Walter J. Koop, and Edmund L. Russell - Walnut Creek; Donald F. Towse-Lawrence Livermore Nat'l Lab., Livermore.

Northwest


Barbara Portwood - Cavenham Energy Res., Portland.

San Joaquin

Lee E. Bailey; John W. Howe; D. E. (Dan) Nedland - ARCO; Ann M. Markstrom - Shell California Prod.; Robert R. Morrison - OXY; Emily Peavler - Shell California Prod.; Dub Ruberts - Shell Western E&P, all in Bakersfield.

Other

John Ostergren-Phillips Pet., Denver.



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Consulting Geologist

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B.L.M. On-Shore Programs In California

The Reservoir Management program of the Bureau of Land Management (BLM) has several components in California. These programs have significant impact upon hydrocarbon exploration and development, but industry is not well informed about them. Several means exist for more industry and A.A.P.G. involvement in these programs.

Mineral Classification Program For Leasing

The federal Mineral Leasing Act of 1920 requires the Secretary of the Interior to lease competitively all lands determined to be within the "known geological structure (KGS) of a producing oil or gas field." In California, the BLM is responsible for the mineral classification of over 40 million acres of sub-surface mineral rights. Recent court decisions and proposed legislative changes have lead to the reinterpretation and revision of KGS policy in California. These changes significantly affect the way that the federal hydrocarbon mineral estate is administered for leasing.

Drainage Protection Program

Standards and procedures for this BLM minerals program were finalized in November, 1986. The BLM has dedicated \$250,000 this year for a computerized drainage-identification program to assist its geologists and engineers in their technical investigations. Over 3000 potential drainage situations have already been identified in California.

Planning Documents and E.I.S.'s.

In addition to the main programs described above, the BLM's reservoir management team reviews the mineral portions of federal land use planning documents. These include documents prepared by the BLM, Forest Service, and Department of Defense. Of special interest to the petroleum industry in California is the Forest Plan for the Los Padres National Forest which is now in its final stages of implementation. An EIS addressing hydrocarbon development in and around Vandenberg Air Force Base is under preparation. Any individual, organization, or company who has relevant geologic or geophysical data bearing upon these land management decisions is encouraged to submit such data to the BLM.

Volunteer Program

The Reservoir Management program for California is centered in Bakersfield. The amount of geologic and engineering research required for the KGS, Drainage, and other programs currently exceeds available manpower. In order to work within budget constraints, the BLM has instituted a volunteer program. One volunteer is now assisting with the Vandenberg EIS. An on-going research project related to the KGS program is producing subsurface structural contour maps and cross sections of the southern San Joaquin Valley at a scale of 1:24,000. Similar maps are proposed for the Sacramento, Los Angeles, Ventura, Santa Maria and Cuyama basins. Those interested in more information about any of these programs may contact Dr. Gregg Wilkerson, Room 311 Federal Building, 800 Truxtun, Bakerfield, CA 93301, (805) 861-4299.

Reader's Corner

GEOLOGY, vol. 14, no. 3, March 1986

Possible controls of base- and precious-metal mineralization associated with Tertiary detachment faults in the lower Colorado River through, Arizona and California, by Jon E. Spence and John W. Welty.

Early Tertiary paleomagnetic evidence and the displacement of southern Alaska, by Gordon A. Thrupp and Robert S. Coe

Neutralization of atmospheric acidity by chemical weathering in an alpine drainage basin in the North Cascade Mountains, by James I. Drever and Douglas R. Hurcomb.

Crater Lake, Oregon: A restricted basin with base-of-slope aprons of nonchannelized turbidites, by C. Hans Nelson, Audrey W. Meyer, Devin Thor and Matthew Larsen.

Isopach pattern of the Lower Cambrian Zabriskie Quartzite, Death Valley region, California-Nevada: How useful in tectonic reconstruction?, by Anthony R. Prave, and Lauren A. Wright.

GEOLOGY, vol. 14, no. 7, July 1986

Kinetic Method for modeling Vitrinite reflectance, by David D. Antia.

Biogenetic grooving on glass shards, by K. A. Ross, and V. R. Fisher.

GEOLOGY, vol. 14, no. 8, August 1986

Empirical method for measuring seasonality in deep-sea cores, by D. B. Scott, V. Baki, C. D. Younger, F. S. Medioli, and C. Stehman.

Structural morphology and associated strain in the central Cordillera (British Columbia and Washington): Evidence of oblique tectonics, by Michael A. Ellis.

Why are marine magnetic anomalies suppressed over sedimented spreading centers?, by Shaul Levi, and Robin Riddihough.

Geomorphic and paleoclimatic implications of latest Pleistocene radiocarbon dates from colluvium-mantled hollows, California, by Steven L. Reneau, William E. Dietrich, Ronald I. Dorn, C. Rainer Berger and Meyer Rubin.

Extinction and survival of plant life following the Cretaceous/Tertiary boundary event, Western Interior, North America, by Robert H. Tschudy, and Bernardine D. Tschudy.

Significance of xenocrystic Precambrian zircon contained within the southern continuation of the Josephine ophiolite: Devils Elbow ophiolite remnant, Klamath Mountains, northern California, by James E. Wright and Sandra J. Wyld.

Evidence for a stronger oxygen-minimum zone off central California during late Pleistocene to early Holocene, by James V. Gardner and Eileen Hemphill-Haley.

Late Cenozoic Arctic Ocean sea ice and terrestrial Paleoclimate, by L. D. Carter et al.

GEOLOGY, vol. 14, no. 10, October 1986

Submarine fissure eruptions and hydrothermal vents on the southern Juan de Fuca Ridge: Preliminary observations from the submersible ALVIN, by U.S. Geological Survey Juan de Fuca Study Group.

Correlation of the Peach Springs Tuff, a large-volume Miocene ignimbrite sheet in California and Arizona, by Allen F. Glazner, Jane E. Nielson, Keith A. Howard and David M. Miller.

Catastrophic flooding and eruption of ash-flow tuff at Medicine Lake volcano, California, by Julie M. Donnelly-Nolan and K. Michael Nolan.

GEOLOGICAL SOCIETY OF AMERICA BULLETIN, vol. 97, no. 5, May 1986

The Moho in the northern Basin and Range

province, Nevada, along the COCORP 40° N seismic-reflection transect, by Simon L. Klemperer, T. A. Hauge, E. C. Hauser, J. E. Oliver and C. J. Poter.

Geochronology of augen gneiss and related rocks, Yukon-Tanana terrane, east-central Alaska, by John N. Aleinikoff, Cynthia Dusel-Bacon and Helen L. Foster.

GEOLOGICAL SOCIETY OF AMERICA BULLETIN, vol. 97, no. 8, August 1986

Stratigraphy of mid-Paleozoic island-arc rocks in part of the northern Sierra Nevada, Sierra and Nevada Counties, California, by Richard E. Hanson and Richard A. Schweickert.

Stabilization of a gravel channel by large streamside obstructions and bedrock bends, Jacoby Creek, northwestern California, by Thomas E. Lisle.

Geochemistry, petrogenesis, and tectonic implications of central High Cascade mafic platform lavas, by Scott S. Hughes and Edward M. Taylor.

GEOLOGICAL SOCIETY OF AMERICA BULLETIN, vol. 97, no. 10, October 1986

North America's largest dinosaur trackway site: Implications for Morrison Formation paleoecology, by Martin G. Lockley, Karen J. Houck, and Nancy K. Prince.

SOUTH COAST GEOLOGICAL SOCIETY, INC., P.O. Box 10244, Santa Ana, CA 92711

Geology of the Imperial Valley, California, Edited by Paul D. Guptil, Eldon M. Gath and Robert W. Ruff. Annual Field Trip Guidebook #14, 1986. \$20.00

BULLETIN OF THE SEISMOLOGICAL SOCIETY OF AMERICA, vol. 76, no. 4, August 1986. p. 1053-1067.

Velocity and Q structure of the Great Valley, California based on synthetic seismogram modeling of seismic refraction data, by L. J. Hwanaga et al.

COLLISION TECTONICS, Geological Society of America Special Publication, Edited by M. P. Coward et al

Collision tectonics in the Cordillera of western north America; examples from Alaska, 1986. p. 367-387.

JOURNAL OF FORAMINIFERAL RESEARCH. vol. 16, no. 3, July 1986, p. 232-243

Paleoenvironmental control of benthic foraminiferal ranges across a middle Miocene basin-margin, Central California, by M. B. Lagoe and Kristin McDougall.

REMOTELY SENSING AND MINERAL EXPLORATION, vol. 3, no. 2, 1983

A strategy for mineral and energy resource independence, by W. D. Carter. p. 223-236.

(Continued on page 4)

(Continued from page 3)

U.S. GEOLOGICAL SURVEY BULLETIN
Geologic studies of the lower Cook Inlet
COST No. 1 well, Alaska outer continen-
tial shelf, edited by L. B. Magoon,
1986. 99 p. \$6.50.

B 1616. JKDIGIT, a program to control a
digitizing board for geologists, written
in BASIC for an IBM Personal Com-
puter by J. O. Kork, 1986. 69 p. \$3.75.

U.S. GEOLOGICAL SURVEY, Open File
Reports

C 69-130: Map showing recently active
breaks along the San Andreas and re-
lated faults, between Cajon Pass and
Salton Sea, Calif., by Roger A. Hope.
Paper: \$7.00; Fiche \$1.00

OF 80-95: Variable rates of Late Quaternary
strike slip on the San Jacinto Fault Zone,
Southern Calif., by Robert V. Sharp.
Paper: \$4.75; Fiche: \$3.50

OF 86-0268: VARMAG; a Fortran program
to implement the variable-magnetization
terrain-correction method for
aeromagnetic data, by V. J. Grauch. 52
p. Microfiche \$4; Paper \$8.25

OF 85-0587: Cenozoic structure of the Val
Verde 7½-minute Quadrangle and south
half of the Whitaker Peak 7¼-minute
Quadrangle, California, by R. S. Yeats,
J. W. McDougall, and L. T. Stitts. 32
p., 4 over-sized sheets, scale 1:24000.
Microfiche \$7; paper copy \$18.

OF 86-0188: Geologic maps of the Knob
Hill, Pine Mountain, Oil Center, and
Bena quadrangles, California, by J. A.
Bartow. 5 over-sized sheets. Microfiche
\$3.75; paper copy \$10.50.

OF 86-0293: Overview of the geology and
geophysics of the Tikishla Park drill
hole, USGS A-84-1, Anchorage,
Alaska, by L. A. Yehle, et al. 10 p.,
1 over-size sheet. Microfiche \$4.75;
paper copy \$9.

U.S. GEOLOGICAL SURVEY GEOLOGIC
QUADRANGLE MAPS

I-1656. Geologic map of the east flank of
the Diablo Range from Hospital Creek
to Poverty Flat, San Joaquin, Stanislaus,
Merced counties, California, by J. A.
Bartow, W. R. Lettis, H. S. Sonneman,
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MINERALS MANAGEMENT SERVICE/
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The structure of mountain ranges, by Peter
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CIRCUM-PACIFIC COUNCIL FOR ENER-
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Tectonostratigraphic terranes of the Circum-
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581 p.

CIRCUM-PACIFIC COUNCIL FOR ENER-
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Energy-resources map of the Northeast quad-
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OK 74101.

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CLASS



PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

of the Pacific Section
American Association of Petroleum Geologists

DECEMBER/JANUARY 1987 NO. 1

President's Corner . . .

January marks the halfway point in my term as President of the Section. During the past six months, Executive Committee meetings have been held in Ventura, Los Angeles, and Bakersfield to coincide with the local Society meetings. I have also attended Society meetings in Sacramento and San Ramon. This has given me the opportunity to meet a large number of Section members. At all of these meetings I have been impressed with the high degree of optimism and enthusiasm of the membership considering the very difficult times geoscientists are working under today. Recent surveys by the National AAPG report over 25% of active members are unemployed, however, California's membership is on the low end of this percentage compared to Oklahoma, Colorado, Texas and Louisiana.

When I started my term as President, I outlined two primary objectives on which to focus the Section's attention during the coming year. One was our responsibility as Host Section for the National meeting of the AAPG in Los Angeles in June, 1987. Under the very capable direction of General Chairman Bud Reid, all indications point toward a meeting with a top quality educational, social and affordable program. **Remember, LA's the place!**

The second objective involved unemployment within our membership. A Committee with Dan Pasquini as Chairman, plus Jack West and Bob Nesbit, has proposed a program introducing alternative employment for oil geoscientists in such work as hazardous waste, engineering geology, water resources, and related science teaching at high school or college level. A notice has been mailed to Section members asking for interest in attending a seminar moderated by geoscientists in these respective fields. At a time when the industry is down, it is important to unite in an effort to keep experienced people, along with recent Earth Sciences graduates, in their field of education.

ROBERT LINDBLOM

**PPG DEADLINE
for FEB./MAR. ISSUE
MARCH 20**

Hodel Announces Appointments To Interior Department Committee

Secretary of the Interior Don Hodel announced appointments of DeWayne Holmdahl, Mary Ellen Wagner Sidenberg, Andrew Palmer, and Stanley F. Thompson to the Department's Outer Continental Shelf (OCS) Policy Committee.

The OCS Policy Committee provides advice to the Secretary of the Interior, through the Director of the Minerals Management Service, in the performance of discretionary functions under the OCS Lands Act. These functions include all aspects of offshore oil and gas leasing, exploration, and development.

Santa Barbara County Supervisor **DeWayne Holmdahl** is a partner in a family ranch-agriculture operation in Lompoc, California. He has been a resident of Santa Barbara County for the past 42 years and has served with numerous, state, county and local committees and organizations. He is an alumnus of Fresno State College and California Polytechnic Institute.

Mary Ellen Wagner Sidenberg, a resident of Goleta, California, was executive director of *Get Oil Out, Inc.*, from 1969 until September of last year. Since 1951, she has held positions in private industry in the areas of personnel, social services and management. She attended Stephens College in Columbia, Missouri, and Iowa State University in Ames, Iowa.

California State University graduate **Andrew Palmer** joined the *Environmental Policy Institute* in 1983 as director of the Ocean, Coasts, and Public Lands Project. He also serves as vice chairperson for the Coast Alliance, a national organization devoted to coastal protection, and is a member of the board of the Alaska Coalition, which focuses on environmental issues in that state.

Stanley F. Thompson served as Mayor of the Kenai Peninsula Borough in Alaska from 1972 to 1976 and again from 1980 to present. Thompson graduated from Harvard College in 1950 with a geology degree. He has lived in the Kenai Peninsula Borough since 1953.

Registration Board Under Attack

The California State Board of Registration for Geologists and Geophysicists met in Los Angeles on January 12, 1987. Dan Pasquini, President-Elect, represented the Section at the meeting and submitted the following report:

The meeting agenda included the Legislation report, Executive Officer and Committee reports on Examinations and Professional Practices, Application review and other miscellaneous items.

A very important item under Legislation was Senate Bill 86 introduced by Senator Daniel Boatwright, District 7, Contra Costa County, which calls for the abolishment of the "State Board of Registration for Geologists and Geophysicists."

At the request of Senator Boatwright the legislative analyst reviewed data on all the boards in the Department of Consumer Affairs and recommended that 6 be abolished. It was found that the Board of Registration for Geologists and Geophysicists had recorded 58 complaints with only 8 jurisdictional and no licenses were revoked. If the Senate bill passes, the Board for Geologists and Geophysicists **will be abolished** as of December 31, 1987.

In support of the Board, it was pointed out that since the inception of the Act there has been a vast improvement in the quality of the work and reports by the geologists and geophysicists; that California leads the nation in registration for the profession, and that approximately 9 states have followed our Act, with 4 states currently giving reciprocity.

Board member Wilferd "Will" Peak reviewed the history which lead to the formation of the State Board. He stated that in the early sixties, during heavy rains in the Los Angeles area, several devastating landslides occurred and that most of the structures destroyed by the landslides should not have been built on their locations. At the time there was not a Board to certify engineering geologists.

As a result Los Angeles City passed an ordinance requiring all practicing "Engineering Geologists" to be certified by the city. By 1968, seven Certification Boards had been formed in the State. Several cities without

(Continued on page 2)

Federal Oil and Gas Leasing in California

The 1920 Mineral Leasing Act requires that all federal leases be evaluated for their presence in a "Known Geologic Structure" ("KGS") prior to issuance. The purpose of the "KGS" program is to obtain fair market value for federal oil and gas leases on presumptively productive lands and at the same time to make leases available on undeveloped structures to all interested parties. Presumptively productive lands are classified as being within a KGS and are leased competitively. Land having a relatively low known oil potential (e.g., those lands outside a KGS) may be leased in one of two ways. Over-the-Counter (OTC) leases are issued to the first qualified applicant who files for the lease. Federal minerals outside of a KGS which have been previously leased are issued through the Simultaneous Oil and Gas (SOG) lottery. These procedures allow the average citizen as well as oil companies access to undiscovered federal minerals. Historically, the small independent oil companies have done the bulk of exploration drilling on SOG and OTC federal oil and gas leases. Royalty rates, rental, and lease term for the three categories of federal oil and gas leases are shown in Table 1. Once a lease becomes productive, the annual rental is discontinued and replaced with a minimum royalty of \$1.00 per acre.

There are 15 KGS study areas in California. The study areas in Southern California are shown in Figure 1. All lease parcels occurring within these study areas require detailed geologic analysis before they can be issued. An example of the distribution of unleased federal lands within a KGS study area is shown in Figure 2. This figure shows the approximate location of federal lease parcels currently under study near the Chico-Martinez, Temblor Ranch, and Belgian Anticline oilfields. The BLM seeks information about the geology of these lease tracts. As with all confidential data, any information that is supplied to the BLM will be kept in secured files and not released to public inspection.

The geologic interpretations which lead to leasing decisions are open to public review and comment, except for industry-supplied confidential data.

The BLM encourages private sector participation in its KGS programs. Some members of the Pacific Section are currently assisting with KGS research projects in California on a volunteer basis. More volunteers are needed. The BLM is beginning work-study programs for undergraduate students through California universities, and a program to provide partial support for graduate theses is also being developed.

Any questions or comments about the KGS program may be made to Dr. Gregg Wilkerson, 800 Truxtun, Room 311, Bakersfield, CA 93301, 861-4299.

Lease Type	Leasing Procedure	Term	Royalty Rate (%)	First Year Rental (per acre)
KGS	Competitive	5 years	12.5-33.3*	\$2.00
SOG	Lottery	10 years	12.5	\$1.00
OTC	First-Come, First-Served	10 years	12.5	\$1.00

Table 1. Federal oil and gas leases as of January, 1987.

* sliding scale, Schedule "D"

(Continued from page 1)

boards required practicing geologists to be certified by other districts. This led to the initiation of the State Board of Registration.

The Board has had to justify its existence on two other occasions and has succeeded. The Board will review those arguments which were brought up in defense of the Board.

During the discussions it was expressed emphatically that a strong positive argument will be needed. Even if the Board is not abolished, it is extremely important that all branches of geology (i.e. petroleum geology) currently represented by the Board get support. Otherwise the petroleum geologists and mining geologists could lose their registration. Merging the Board with the Engineering Board may be one of the Senator's alternatives.

Mr. Bill Park expressed concern over the emphasis given to the retention of engineering geologists' registration and not that of petroleum geologists'. He cited several examples of how the petroleum geologists' work has improved since the inception of certification. Mr. Park was associated through the AIPG in lobbying to include the petroleum geologists' certification through the Board. He is very concerned over this Senate bill and has informed the Board that when selections are made, he would like to be on the committee opposing SB 86.

Mr. Park said the support of the Pacific Section is extremely important in helping the board argue the merits of its existence. Therefore, if you would like to express your concern over the issue of Senate Bill 86, write to your State Senator. It is also requested that you send a copy of your letter to:

John Wolfe
Executive Office
1021 O Street
Room # A190
Sacramento, California 95814

I would like to thank the Board of allowing the Pacific Section to be represented at their meeting. I felt very welcome and was encouraged to support their efforts.

DAN PASQUINI

DOE Deep Test Drills Ahead

The Department of Energy with Bechtel Petroleum Operations Inc. as operator has chalked up a new depth record for the Elk Hills field and is drilling ahead in an ongoing search for deeper pool production.

The exploratory well in the western portion of the billion-barrel field is below 18,879 feet, making about three feet an hour with a 9 $\frac{3}{8}$ inch diamond bit and turbine.

DOE's No. 934-29R lies 4 $\frac{1}{2}$ miles west of the No. 987-25R, the former record-depth well at Elk Hills. The latter well was spudded in January 1977 and went to 18,761 feet. On bottom, the hole was in low-grade metamorphic rocks believed to be basement.

The Department of Energy cored five feet of gas-condensate sand at a depth of about 17,900 feet in what was dated as early Eocene, but mechanical problems intervened before any tests were made. The hole eventually was plugged back to 9,800 feet in proved pay.

The current deep test well has had the strongest encouragement yet encountered in the probe for deeper production at Elk Hills. On an open-hole test of a 100-foot interval from 17,400 to 17,500 feet, there was a flow of formation water at a rate of about 1,500 barrels a day and gas at a rate of about 790,000 MCF/D through a 20/64-inch choke.

The Elk Hills exploratory well is programmed for a depth of 25,000 feet, which would make it the deepest hole ever drilled in California. The record is held by Tenneco Oil Co.'s Tenneco-Superior-Sandhills No. 64X, which was abandoned in 1975 at 22,711 feet near Mettler Station on Highway 99, 25 miles southeast of the Elk Hills field. The Sandhills wildcat topped Stevens at 15,030 feet and was in Eocene rocks on bottom.

At present depth, the Elk Hills venture is the 12th-deepest hole in the state. The wells that were deeper include Chevron's OCS-P0335 No. 1 in the Santa Barbara Channel, 19,000 feet, abandoned in 1981; Shell's Vilche No. 2-5 near Red Bluff, 19,670 feet, abandoned in 1980; American Quasar's Bravo No. 1-31 in Kings County, 20,068 feet, abandoned in 1978; Texaco's San Emidio No. 1 at Yowlumne, 20,704 feet,

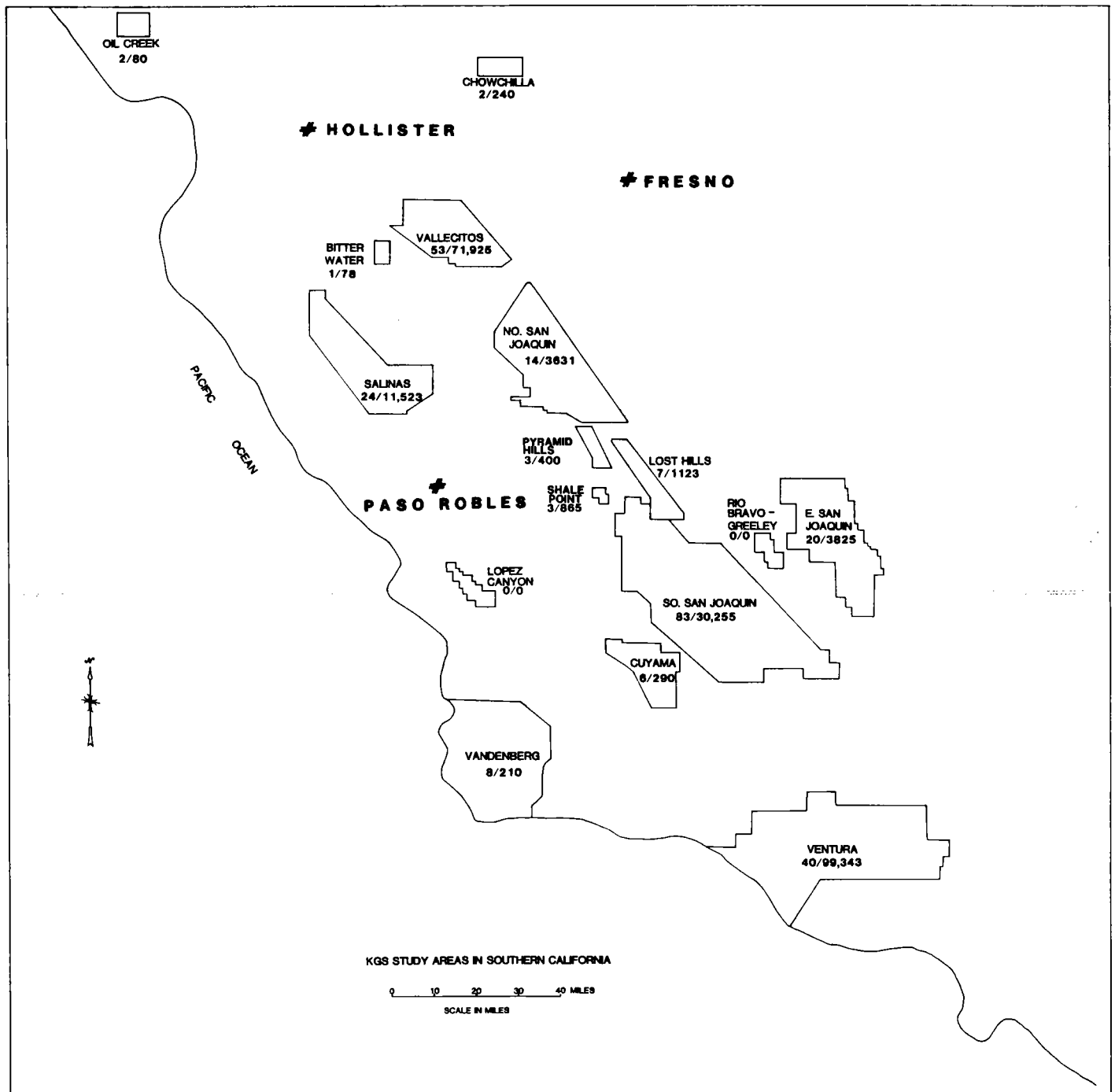


Figure 1. Known Geologic Structure study areas in Southern California. First number indicates number of lease parcels under review, second number indicates number of acres.

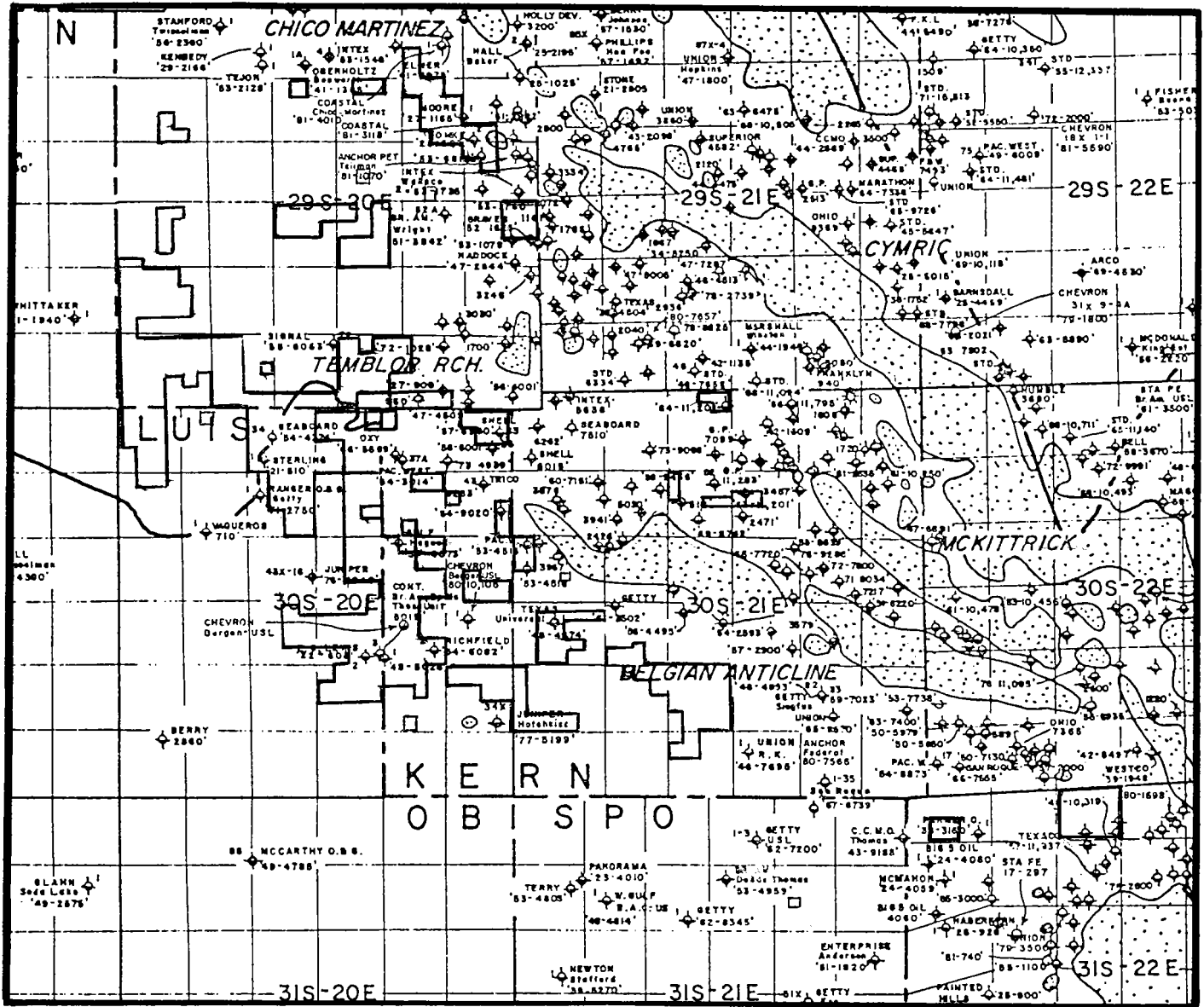


Figure 2. Unleased federal parcels awaiting processing because geologic research is not yet completed. See text for details.

completed in 1974 from Stevens sand at about 11,400 feet;

Mobil's Tupman USL No. 1 at Buttonwillow, 20,753 feet, abandoned in 1974; American Petrofina's Central C.H. No. 1 at Watts, 21,215 feet, abandoned in 1975; Ohio Oil Co.'s KCL A No. 72-4 at Paloma, 21,482 feet, abandoned in 1954; Shell's Taylor No. DT 653 at Venture, 21,500 feet completed in 1974 from plugged-back depth in proved pay;

Great Basins's Tenneco No. 31X-10 at Buttonwillow, 21,640 feet, abandoned in 1973; Texaco's Yowlumne No. 21-13 at Yowlumne, 22,030 feet, completed in 1976 from proved pay in the Steven zone; and Tenneco's Tenneco-Superior-Sandhills No. 64X.

BILL RINTOUL

Library Seeks Donations

As part of its rebuilding program, following a disastrous fire, The Los Angeles Public Library is seeking donations of geologic and petroleum industry related literature.

In order to efficiently manage their growing collection the Library asks that potential donors first send a list of available literature to:

Billie Connor
Science and Technology Dept.
630 West 5th Street
Los Angeles, CA 90071

Coast

The February meeting of the Coast Geologic Society has been scheduled for **TUESDAY, February 10, 1987**. The program will be provided by Anthony J. Tankard, AAPG Distinguished Lecturer. His topic will be "Extensional Tectonics and Stratigraphy of the Hibernia Oilfield, Grand Banks."

New Members

Los Angeles

Craig K. Ogawa and Scott B. Sorensen — Minerals Management Service.

Northern California

David B. Engstrom — Walnut Creek; **Jeff Eppink** — Chevron, San Ramon.

San Joaquin

Gerrit Schaar — Bakersfield.

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Recent Moves

Buzz Delano and **Jim Vohs**, formerly with Schlumberger, have joined Res Tech California, a Division of Res Tech Inc., Houston. Their company offers petrophysical data processing and interpretation services of wireline log data. Buzz is located at 5401 Business Park South, Suite 210, Bakersfield (805-325-3987). Jim is located at 2151 Alessandro Drive, Suite 110, Ventura, (805-653-1579).

Dibblee Maps Now Available In Color

The Thomas Wilson Dibblee, Jr., Geological Foundation, a tax-exempt, non-profit corporation, was established in 1983 to preserve through publication most, if not all, of Tom Dibblee's geologic mapping. At the outset it was envisioned that the maps would be published in only two colors, black and brown, at a cost of \$5.00 each. The Foundation has since decided to print these maps in a spectrum of colors, and several of these colored versions: the Old Man Mountain, the Wheeler Springs, the Hildreth Peak and Carpinteria quadrangles, are now available. Colored maps are for sale at a cost of \$6.00 per copy, post paid, and may be obtained from the Foundation at P.O. Box 60560, Santa Barbara, California, 93160.

Pacific Legal Foundation Supports Challenge

The United States Supreme Court is being asked to decide the important issue of whether a court may issue a far-reaching injunction in an environmental case without first considering public interest and economic equities as well as environmental equities.

In this case the Ninth Circuit again applied that rule and enjoined energy development and offshore oil exploration on the outer continental shelf off Alaska. The lawsuit is an action brought by a coalition of environmental interests seeking to stop federal gas and oil lease sales offered by the Dept. of Interior. PLF will point out to the Supreme Court that the Ninth Circuit's decision creates an exception to outer continental shelf development policies and decision-making procedures as enacted by Congress and thus the Ninth Circuit in this case is usurping Congress' role as the setter of national policy.

Pacific Section AAPG Membership Report January 12, 1987

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HONORARY	3
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HONORARY	3
	<u>197</u>

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HONORARY	13
	<u>342</u>

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	<u>40</u>

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SUBSCRIBER (BS-AK)	1
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ACTIVE (BA-US)	144
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Readers Corner

JOURNAL OF GEOPHYSICAL RESEARCH, vol. 91, no. 3, March 10, 1986

Basin and Range large-scale tectonics; constraints from gravity and reflection seismology, by Claude Froidevaux, p. 2625-2632.

GEOLOGY, vol. 14, no. 9, September 1986

Major evolutionary phases of a forearc basin of the Aleutian Trench; relation to North Pacific tectonic events and the formation of the Aleutian subduction complex, William Harbert, D.W. Scholl, T.L. Vallier, A.J. Stevenson and D.M. Mann.

GEOLOGY, vol. 14, no. 10, October 1986

Submarine fissure eruptions and hydrothermal vents on the southern Juan de Fuca Ridge: Preliminary observations from the submersible ALVIN, by U.S. Geological Survey Juan de Fuca Study Group.

Correlation of the Peach Springs Tuff, a large-volume Miocene ignimbrite sheet in California and Arizona, by Allen F. Glazner, Jane E. Nielson, Keith A. Howard and David M. Miller.

Catastrophic flooding and eruption of ash-flow tuff at Medicine Lake volcano, California, by Julie M. Donnelly-Nolan and K. Michael Nolan.

GEOLOGY, vol. 14, no. 11, November 1986

Eocene basalts from the Yakutat terrane: Evidence for the origin of an accreting terrane in southern Alaska, by Alice S. Davis, George Plafker.

Age of -360-m reef terrace, Hawaii, and the rate of late Pleistocene subsidence of the island, Barney J. Szabo, James G. Moore.

GEOLOGICAL SOCIETY OF AMERICA BULLETIN, vol. 97, no. 10, October 1986

Mesozoic paleomagnetism and northward translation of the Baja California peninsula, by Gary Pischke, R.G. Gastil, Monte Marshall, J.T. Hagstrum, M.O. McWilliams, D.G. Howell and C.S. Gromme.

MICROCOMPUTER APPLICATIONS IN GEOLOGY 5, 1986

(J.T. Hanley, editor & others)
 Management of earth-science databases and a small matter of data quality, by J.D. Bliss.

An overview of the state of computing in the earth sciences. J.M. Botbol.

A hybrid microcomputer system for geological investigations, by J.M. Botbol & G.I. Evenden.

Micro-GRASP, a microcomputer data system, by R.W. Bowen.

MARINE MICROPALAEONTOLOGY, vol. 7, no. 6, 1983

Latest Oligocene through early middle Miocene diatom biostratigraphy of the eastern tropical Pacific, by J.A. Barron.

OREGON GEOLOGY, vol. 48, no. 9, September 1986

Lithology and hydrochemical alteration of drill hole RDO-1, Newberry Caldera, Oregon, by T.E. Keith, M.W. Gannett, J.C. Eichelberger and A.F. Waibel.

U.S. GEOLOGICAL SURVEY

Bulletin 1651 Basement-rock correlations across the White Wolf-Breckenridge-southern Kern Canyon fault zone, by D.C. Ross, 1986. 25p.; 1 plate. \$2.00.

MF-1853-A Structure contour map of the tops of the Kreyenhagen Formation and Cretaceous strata in the Coalinga area, Fresno and Kings counties, Calif., by J.L. Zigler, C.M. Wentworth, and J.A. Bartow, 1986. Scale 1:100,000. Sheet 41 by 43 inches. \$1.50.

OF 86-0202 1985 field studies, Beaufort and

Chukchi seas, conducted from NOAA ship Discoverer, edited by J.M. Miley, and P.W. Barnes. 57 p., 5 over-sized sheets. Microfiche \$7.75; paper copy \$29.

OF 86-0250 Abandoned-well study in the Santa Clara Valley, Calif., by R.C. Jachens, M.W. Webring, and F.C. Frischknecht. 13 p., scale 1:24,000. Microfiche \$4.75; paper copy \$4.75.

OF 86-0349 Drilling logs and wireline geophysical logs of the Cajon Pass well, San Bernardino County, Calif., by D.J. Stierman. 167 p. Microfiche \$4; paper copy \$25.25.

OF 86-0373 Global oil assessment and the search for non-OPEC oil, by C.D. Masters. 20 p. Microfiche \$4; paper copy \$3.50.

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