PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

of the Pacific Section
American Association of Petroleum Geologists

Winter 1993 No. 1

CONVENTION & ELECTION ISSUE

PRESIDENT'S COLUMN

Belated Holiday Greetings to One and All!

Don Clarke and his Committee are busy working on the Long Beach Convention. On-site volunteers are still needed, please call Don at 310/590-6084.

The Newsletter Staff is looking for an Advertising Chairman. Please contact **Tom Berkman** at ARCO (805/321-4007) or **JoAnn Conard** at Bechtel (805/763-6183).

The AAPG Pacific Section and the newly formed Division of Environmental Geosciences (DEG) will be co-hosting a forty hour OSHA approved course entitled "40 Hour Health and Safety Training for Hazardous Waste Workers".

The Course will be held February 20-21 and 27-28, 1993 from 7:00 a.m. to 6:00 p.m. in Chevron's Office located at 5400 Rosedale Highway in Bakersfield. OSHA Certification will be granted to all who successfully complete the Course. Enrollment will be limited to 25 participants at a cost of $450 if payment is received by February 10, 1993, or $525 at the door.

A more detailed article regarding the Course appears on Page 4 of this Newsletter. If this Course is successful, we hope to offer it on an annual basis.

Paul D. Hacker, President
January 29, 1993

PACIFIC SECTION 1993 CONVENTION

"Energy & Environment"

May 3 - 9, 1993

Hyatt Regency Hotel, Long Beach, California

The 1993 Annual Meeting of the Pacific Section AAPG, Society of Economic Paleontologists and Mineralogists, South Coast Geological Society, Society of Exploration Geophysicists, Association of Engineering Geologists, Society of Petroleum Well Log Analysts, Society of Core Analysts, and the American Institute of Professional Geologists will be held in Long Beach, California from May 3 - 9, 1993. The site of the convention will be the Long Beach Hyatt Regency Hotel adjacent to the Long Beach Convention Center. The Los Angeles Basin Geological Society and the South Coast Geological Society are hosting the convention. The convention theme is "Energy and Environment". Technical Sessions and presiders are listed below.

SESSIONS

WEDNESDAY, MAY 5, 1993

- **Billion-Barrel Oilfields of California - Symposium Introduction / South Belridge & Kern River Fields** (Frank Cressy & Mike Mulhern)
- **Geology & Tectonics of the South Coast Region I: Geologic History & Paleotectonics** (Dave Bottjer & G. C. "Butch" Brown)
- **Active Faulting in California** (Eldon Gath & Patricia Bell)
- **Groundwater Issues** (Prem Saint & Roy Herndon)
- **Technical Session - Poster Presentations** (Peter Fischer)

THURSDAY, MAY 6, 1993

- **Billion-Barrel Oilfields of California - Coastal (Wilmington / Huntington Beach / Long Beach / Ventura / Sespe)** (Curtis Henderson & Ken March)
- **A Sedimentary Pot Pourri** (Gene Fritsche & Vicki Pedone)
- **Geology & Tectonics of the South Coast Region II: Areal & Local Studies** (William A. Bartling & Thomas Wright)
- **Environmental Applications of Remote Sensing** (Scott Hills)
- **Billion-Barrel Oilfields of California - Midway Sunset** (Frank Cressy & John Randall)
- **Geology & Tectonics of the South Coast Region III: Regional Geophysics & Neotectonics** (Mark R. Legg & Thomas L. Henyey)
- **Mesozoic Paleogeography of the Western United States** (Gene Fritsche)
- **Environmental Concerns in the Petroleum Industry** (Mike Mitchell & Roy Burlingame)

FRIDAY, MAY 7, 1993

- **Billion-Barrel Oilfields of California - Elk Hills** (Maurice D. Fishburn & George S. McJannet)
- **New Reservoir Evaluation Technologies / SEG General Topics** (John Crowe, June Gidman & Phil Eliades)
- **Oil, Gas & Environmental Law** (Peter Raftery & Kevin Neese)
- **History of Engineering Geology in Society** (John Foster)

(continued on Page 2)

"Energy & Environment"

SHORT COURSES

COURSE #1
FRIDAY, MAY 7, 1993

Ten Steps to Closure: Technical & Regulatory Guidelines to be Followed through the Life of an Environmental Remediation Project (Timothy P. Garvey & Samuel L Unger, P.E., Groundwater Technology, Inc., Ventura, California)

COURSE #2
MONDAY, MAY 3, 1993

Various Phases of Environmental Assessment Objectives, Techniques & Data Evaluation (Joshua Ong, Ph.D., Advanced GeoEnvironmental, Inc., Anaheim, California)

COURSE #3
MONDAY, MAY 3, 1993

Detection, Monitoring & Remediation of Non-Aqueous Phase Liquids (Stephen M. Testa, Applied Environmental Services, Inc., Laguna Hills, California)

COURSE #4
TUESDAY, MAY 4, 1993

Economic Evaluation of Oil Properties for Geologists (James R. Weddle & Donna M. Thompson, San Joaquin Energy Consultants, Inc., Bakersfield, California)

COURSE #5
TUESDAY, MAY 4, 1993

Horizontal Well Technology & Applications in California (Stephen A. Reid, Bechtel Petroleum Operations, Inc., Tupman, California & Jonathan G. Kuespert, Los Angeles, California)

COURSE #6
FRIDAY, MAY 7, 1993

Eight Hour Annual Hazardous Workers Course (Kenneth A. Thornburgh, Ph.D., Applied Environmental Services, Inc., Laguna Hills, California)

COURSE #7
SATURDAY, MAY 8, 1993

An Overview of Reservoir Seismic Stratigraphy (Thomas R. Wittick, Lindon Exploration Company, The Woodlands, Texas)

COURSE #8
FRIDAY, MAY 7 THROUGH
SATURDAY, MAY 8, 1993

California Registered Geologist Review (Lisa Dirth & Patti Osiecki, REG Review, Inc., Oakland, California)

FIELD TRIPS

FIELD TRIP #1
VARIOUS DATES

THUMS Island Tour (Coordinators: George Otott, Curtis Henderson & Don Clarke, Department of Oil Properties, City of Long Beach, California).

Three separate tours each with a different emphasis. Wednesday, May 5, 1993 - Spouse Tour; Thursday, May 6, 1993 - General Tour; Friday, May 7, 1993 - Geologist Tour. Departure Time is 9:00 a.m. each day, with a Return Time of 1:00 p.m. each day.

FIELD TRIP #2
SATURDAY, MAY 8, 1993

Santa Barbara Groundwater & Wines (Coordinators: Earl LaPensee, Richard Slade, & Linda Smith, Richard C. Slade & Associates, North Hollywood, California).

Departure Time is at 7:30 a.m., with a Return Time of 6:00 p.m.

FIELD TRIP #3
SATURDAY, MAY 8 THROUGH
SUNDAY, MAY 9, 1993

Miocene Sedimentary & Volcanic Environments, Santa Monica Mountains (Coordinators: Eugene Fritsche & Peter Weigand, California State University, Northridge, California; Tom Dibblee & Helmut Ehrenspeck, Thomas W. Dibblee, Jr. Foundation, Santa Barbara, California; & Several Additional Leaders).

Departure Time is at 7:00 a.m. on Saturday, with a Return Time of 4:00 p.m. on Sunday.

FIELD TRIP #4
SATURDAY, MAY 8 THROUGH
SUNDAY, MAY 9, 1993

Cultural & Geomorphic Changes Caused by the Landers Earthquake (Coordinators: Bob Lemmer & Ed Steiner, Leighton & Associates, Diamond Bar, California).

Departure Time is 7:00 a.m. on Saturday, with a Return Time of 5:00 p.m. on Sunday.

RENTAL FEES REQUIRED FOR UNPATENTED MINING CLAIMS

The fiscal year 1993 Appropriations Act for the Department of the Interior, signed October 5, 1992, requires holders of unpatented mining claims to pay the federal government a new rental fee of $100 per claim per year.

The new fee is expected to reduce unnecessary surface disturbance that may be carried out solely to maintain a mining claim and discourage nuisance mining claims. The rental fees will be deposited into the general treasury, and a portion will be returned to the Bureau of Land Management (BLM) to fund the Agency's mining law administration program.

The rental fee requirement, which will expire September 30, 1994, suspends a mining law requirement for performance of a minimum of $100 of assessment work per year. The two rental years are September 1, 1992 through August 31, 1993, and September 1, 1993, through August 31, 1994. Claims are defined as lode claims, placer claims, mill sites and tunnel sites. There are more than 150,000 mining claims on federal lands in California.

The BLM is issuing interim procedures for meeting the new requirements and for processing the fees. Draft rules will also be published shortly for implementing the rental fee provisions, with final rules expected early in 1993.

Congress made an exception to the rental requirement for "small miners" who have ten or fewer claims and who meet certain criteria with respect to levels of production or exploration activity and unreclaimed surface disturbance. The BLM is reviewing these criteria and will issue guidance to mining claimants in the near future.

Some key provisions of the rental fee requirement are as follows.

Claims Located on or Before October 5, 1992: The BLM's initial interpretation of the Congressional language suggests that claimants will still have to submit to BLM by December 30, 1992, an affidavit that they have completed $100 worth of work per claim between September 1, 1991 and September 1, 1992.

To hold their claims for the next two years, claimants must pay the BLM the $100 per claim rental on or before August 31, 1993, for the year ending September 1, 1993, and an advance rental of $100 per claim on or before August 31, 1993, for the year beginning September 1, 1993. Failure to remit the rental will constitute a statutory abandonment of the claim, and it will be declared void.

Claims Located After October 5, 1992: For claims, mill sites and tunnel sites located after October 5, 1992, a certificate of location must still be filed with the appropriate BLM state office. The certificate must be accompanied by a $10 service fee and a $100 rental fee for each claim. The rental fee covers the rental year in which the location was made.

An advance rental fee will also be due on August 31, 1993, to hold the claim for the following rental year. Rentals are $100 per claim per year even if the claimant holds for only a partial year. There will be no prorating of rentals.

California Bureau of Land Management
News Release, November 16, 1992

San Joaquin

February 9 - Harold Sugden, Consulting Geologist, and Ben Nafus, "Similarity: Miocene of San Joaquin and Isla Cedros: More Than A Coincidence?" Spouse's Night.

March 9 - George McJannet, U. S. Department of Energy and Mark Wilson, Bechtel Petroleum Operations, Inc., "Elk Hills: The Latest Billion Barrel Oil Field".

The San Joaquin Geological Society has a new President-Elect. Rusty Riese, ARCO Oil & Gas Company, will be the President-Elect in 1992 - 1993 and the President in 1993 - 1994. He replaces Jack Mayhew, UNOCAL, who has transferred to Los Angeles.

Suggestions for meeting speakers or topics should be addressed to Bill Bazeley at 805/325-5746.

The meetings are held at the American Legion Hall at 2020 H Street in Bakersfield. Attitude adjustment starts at 6:00 p.m. and dinner is served at 7:00 p.m. For more information and reservations please contact Terry Thompson at 805/763-6322.

Los Angeles

November 5 - Steven Testa, Applied Environmental Science, "Mitigation of Hazards from Mt. Pinatubo Volcano, Phillipines". Officers for 1993 will be nominated at this meeting.

Luncheon meetings are held at noon on alternate months. Meetings are held at UNOCAL Center, California Room, 1201 West Fifth Street, Los Angeles. Visiting geologists and friends are cordially invited.

For reservations or information, please contact Reggie Moore at 714/455-4080.

Northern

The Society is asking all current members to renew their membership at this time. Please send your name, address and telephone number along with your check to Phyllis Stanin, 1246 Crimson Court, Walnut Creek, California 94596. The annual cost of membership is $10.00 and you may send an additional $5.00 for their Scholarship Fund.

If you would like more information, please leave a message at 510/842-4096 and your telephone call will be returned.

Northwest

For suggestions or questions, please contact Lanny Fisk at 503/382-0825, Barbara Portwood at 503/287-2762, or any other member of the NWPA Program Committee: Phil Brogan, Harry Jamison, Paul Dudley or Nancy Ketrenos.

Coast

January 19 - Thomas A. Ryer, Distinguished Lecturer, The ARIES Group, Inc., "Multiple Origins of Clastic Wedges in the Western Interior Foreland Basin - A Stratigrapher's Approach".

February 16 - Hugh A. Loaiciga, Department of Geography and Environmental Studies Program, University of California at Santa Barbara, "Hydrocarbons, Groundwater Pollution and Remediation Methods".

March 16 - Bruce W. Bromley, UNOCAL Science and Technology Division, "Geologic Control of Oil Gravity in California".

April 20 - Peter W. Weigand, Department of Geological Sciences, California State University Northridge, "Indonesia - Tectonics and Volcanism".

Meetings are held the third Tuesday of every month. Social hour is at 6:00 p.m., dinner at 7:00 p.m. at the American Legion Hall in Ventura. The address is 83 South Palm Street. For reservations please contact Groundwater Technology's Receptionist at 805/644-9811 **by 10:00 a.m. at least one day before the meeting.** Reservations are required to guarantee dinner.

SACRAMENTO PETROLEUM ASSOCIATION

Wednesday meetings are held at noon at the Hungry Hunter Restaurant, 450 Bercut Drive, Sacramento. Please contact Rich Boyd at 916/929-4141 for reservations.

COMING EVENTS

February 20, 21, 27 & 28 - Forty Hour Health & Safety Training For Hazardous Waste Workers. Please see the article on Page 4 for more information.

April 25 to 30 - 29th Forum on Industrial Minerals, Long Beach. Sponsored by the California Division of Mines and Geology and the United States Bureau of Mines. Please contact Dave Beeby, California Division of Mines and Geology, at 916/323-8562 for more information.

May 5 to 7 - Pacific Section AAPG 1993 Annual Convention, "Energy and the Environment", Long Beach, California. Please see the cover page for more information.

June 19 to 21 - The Nevada Petroleum Society, 1993 Field Trip, "Structural and Stratigraphic Relationships of Devonian Reservoir Rocks, East Central Nevada". Please see the article on Page 4 for more information.

GEOLOGISTS & GEOPHYSICISTS BOARD ANNOUNCES NEW APPOINTMENTS

Howard "Buzz" Spellman, President of the Department of Consumer Affairs' Board of Registration for Geologists and Geophysicists, today announced the appointment of two distinguished and respected professionals to the Board.

Governor Pete Wilson appointed **Robert G. Lindblom**, a petroleum geologist from Menlo Park. Mr. Lindblom received his bachelor's degree in geology from the University of Chicago in 1950, and performed post-graduate work in geology and petroleum engineering. He has worked for Standard Oil Company and Chevron U.S.A., and current is a lecturer at Stanford University.

"Mr. Lindblom is a uniquely qualified petroleum geologist who will help ensure that geological practices in the state are conducted safely and professionally," sand Jim Conran, Director of the California Department of Consumer Affairs which oversees the Board.

Speaker of the Assembly Willie Brown made the second appointment to the board by choosing John H. Larson of Seal Beach to serve as a public member. Mr. Larson received his L.L.B. degree from U.S.C. in 1958, and served as counsel for Los Angeles County from 1973 to 1983. He was also appointed by Former Governor Deukmejian as chair of the Fair Political Practices Commission in 1986.

"It is always important to have a strong public voice on our board, and we welcome Mr. Larson to the exciting challenges that face the geologic profession," said the Board President, Mr. Spellman.

The Board of Registration for Geologists and Geophysicists is responsible for public safety by ensuring that its licensees properly evaluate building sites for faults, earthquake potential, erosion and landslide hazards, and ground subsidence. Additionally, geologists and engineering geologists develop safe drinking water from wells, and assist in implementing the State's "Clean Water Act" which helps minimize contaminants found in groundwater.

California Department of Consumer Affairs, News Release January 13, 1993

POEM

To tell a story you must travel far
I sing with the voice of the land
Stony mountains, sagebrush and sand
Clouds shadows racing over lupine blue
Ragged traceries, swept grassy waves
Crash against grey fence post
Echoing horses hooves, Indian ghost.

To tell a story you must travel alone
Listen to voices among the rocks
They speak of change, these slow clocks
Minerals in crystalline crypts below
Ponderously speak scintillating rhyme
Rocky cliffs swept by ocean swells
Spindrift and seafoam histories tell.

To tell a story you must travel in
Night stars drew me to a dream
Of atoms whirling, photons beams
Flickering grasshoppers, living sparks
Chickerees chatter, cold fireflies light
Whispering, muttering Sequoia and Pine
Aspen leaf and needles sibilance
combine.

To tell a story you must travel free
Wind and water, warm fires at night
Songs of glaciers and starlight
Life, a journey slow or rushed
Awareness spun from genetic ribbons
Melded and molded in joy and pain
Unique trails not to unwind again.

Pat Bell, 1992

HELP WANTED

Newsletter staff seeks companies/individuals to place advertisements in upcoming issues. Advertisements should be camera-ready, preferably in the desired size. Four (4) issues of the newsletter are published a year. Costs for popular sizes are listed below.

Size	Cost
Business Card	$ 60.00 / Issue; $190.00 / Year
1/8 Page (Double Column)	$150.00 / Issue; $470.00 / Year
1/3 Page	$250.00 / Issue; $800.00 / Year

Please contact Tom Berkman (805/321-4007) or JoAnn Conard (805/763-6183) for more information.

NEVADA PETROLEUM SOCIETY CALL FOR PAPERS

Structural & Stratigraphic Relationships of Devonian Reservoir Rocks, East Central Nevada
June 19 - 21, 1993

The Nevada portion of the Great Basin has the potential to be one of the most prolific hydrocarbon producing regions of the world. However, exploration has been hindered by a lack of understanding of the nature of the relationship of Devonian reservoir rocks to the structural framework of that part of the basin. Are the effects of Paleozoic and Mesozoic thrusting widespread or more localized? Can the prolific production in Eureka and Nye Counties best be explained by the more traditional and conservative concepts of localized, gravity induced thrusting masked by Tertiary block faulting and volcanism or by multiple, large scale, low angle, imbricate thrust systems? What new data exist to support or refute each position?

The Nevada Petroleum Society's 1993 Field Trip will attempt to examine outcrop evidence relative to these questions. The information provided will be of great interest to both oil and gas and minerals explorationists, as well as leaseholders.

The Nevada Petroleum Society is soliciting quality papers from the industry, academe, and government scientists with good evidence to help resolve this geologic dilemma. The guidebook will be divided into three sections: 1) evidence for large-scale thrusting, 2) other concepts or explanations and, 3) non-Great Basin thrust belt case history and/or methodology papers for comparison purposes. In the interest of encouraging new exploration methods, special consideration will be given to papers dealing with the use of sequence stratigraphy techniques to resolve structural problems encountered in thrust belts.

Papers should be submitted by March 1, to Charles W. Gillespie, Guidebook Editor, P. O. Box 10350, Reno, NV 89509 - 702/786-4000 - 702/786-4888 (fax). Anyone interested in participating as a field trip leader may contact Neal Brecheisen, Field Trip Committee, 1030 Gentry Way #5, Reno, NV 89502 - 702/785-6574.

FORTY HOUR HEALTH & SAFETY TRAINING FOR HAZARDOUS WASTE WORKERS

The American Association of Petroleum Geologists (AAPG), Pacific Section, and Division of Environmental Geosciences (DEG) are planning to teach an Occupational Safety and Health Administration (OSHA) approved course entitled "40 Hour Health and Safety Training for Hazardous Waste Workers". The course will be held in Bakersfield on two consecutive weekends, February 20-21 and 27-28, 1993, and will consist of a combination of lecture, workshop, and simulated field exercises. Participants will receive an overview of health and safety regulations and be instructed in topics such as setting up a safety plan, proper use of personal protective equipment and monitoring instruments, emergency response, hazard communication, and sample collection.

All participants who successfully complete the course will receive a certificate of completion. OSHA certification is required for work at any Resource Conservation and Recovery Act (RCRA) regulated facilities.

Enrollment will be limited to a maximum of 25 participants and a minimum of 15. Preference will be given to AAPG members. The cost of the course will be $450 if payment is received by February 10, or $525 at the door. Continuing Education Units (CEUs) may be available for an additional cost.

For additional information, please contact Jim Waldron at (805)395-6439.

CANDIDATES FOR OFFICE - PACIFIC SECTION AAPG

ROBERT L. COUNTRYMAN, Candidate for President-Elect

Present Position:
Senior Equity/Development Geologist, Chevron USA, Inc., Bakersfield, California

Education:
1973, California State University, Northridge, B.S. Geology; 1977, University of California, Los Angeles, M.S. Geology

Employment:
1973 - 1976: Industrial Minerals Geologist; Tenneco Oil Company, Nevada; 1977 - 1979: Research Geophysicist; UCLA, South Pole, Antarctica; 1979 - 1984: Exploration & Production Geologist, Development Geology Supervisor, Gulf Oil Company, Bakersfield; 1984 - 1987: Stratigrapher, Venezuela Task Force, Chevron Overseas Petroleum; 1987 - Present: Development/Enhanced Oil Recovery/Equity Redetermination Geologist, Chevron USA, Bakersfield.

Professional Activities:
California Registered Geologist #4868; National AAPG & DEG; Pacific Section AAPG & SEPM; San Joaquin Geological Society; Geological Society of America; Vice President, Pacific Section AAPG, 1992 - 1993; Secretary, Pacific Section AAPG, 1990 - 1991; President/President-Elect, SJGS, 1984 - 1986; Vice President, SJGS, 1983 - 1984; SJGS Delegate to National AAPG, 1991 - 1994; Editor, SJGS Selected Papers, Volume 7; Chair , Co-Chair, or Participant on Committees for Various Pacific Section AAPG Conventions & Activities.

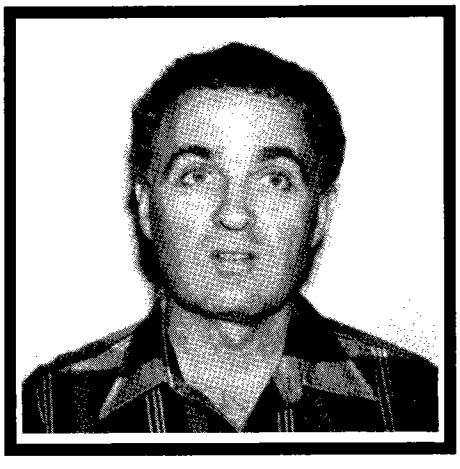
MURIEL R. NORTON, Candidate for Vice President

Present Position:
Geologist/Vice President, Geoquip Corporation, Ventura, California

Education:
Ventura College, A.A Accounting; 1983, California Lutheran University, B.A. Geology

Employment:
1959 - 1972: Technical Geological Assistant, The California Standard Company, BP (Alaska) Inc., & Other Consultants in the Petroleum Business, Canada & California; 1976 - 1986: Marine Geologist/Interpreter, McClelland Engineers, Inc., Ventura; 1986 - Present: Geologist/Vice President, Geoquip Corporation, Ventura.

Professional Activities:
National AAPG; Pacific Section AAPG; Coast Geological Society, Secretary, 1986 - 1987; Pacific Section AAPG Annual Convention, Printing Chairman, 1988; Pacific Section AAPG, Treasurer, 1991 - 1993.



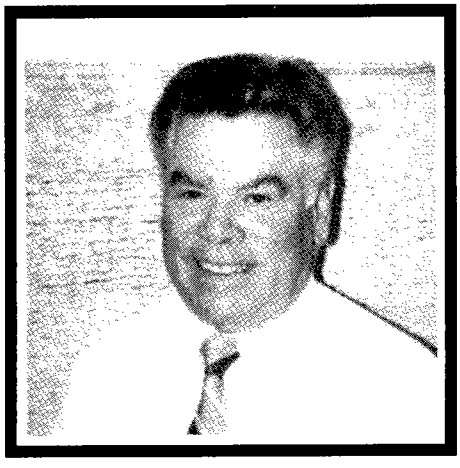
J. ALLEN WAGGONER, Candidate for Secretary

Present Position:
Geologist, WZI Inc., Bakersfield, California

Education:
1976, San Diego State University, B.S. Geology; 1979, San Diego State University, M.S. Geology

Employment:
1979 - 1985: Exploration Geologist, Senior Exploration Geologist, Tenneco Oil Company, Bakersfield; 1985 - 1987: Senior Geologist, Great American Resources, San Diego; 1988 - 1991: Project Geologist, ICG Inc., San Diego; 1987 - Present: Geological Consultant, World Resource Development, San Diego; 1992 - Present: Geologist, WZI Inc., Bakersfield.

Professional Activities:
National AAPG; Pacific Section AAPG; AAPG Division of Environmental Geosciences; San Joaquin Geological Society; San Diego Association of Geologists; Secretary, San Joaquin Geological Society, 1981 - 1982; Golden Empire Chapter of the Air Waste & Management Association.



DAVID C. SALTER, Candidate for Treasurer

Present Position:
Staff Geologist, Groundwater Technology, Inc., Ventura, California

Education:
University of California at Los Angeles, B.A.

Employment:
1957 - 1976: Exploration & Development Geologist, Technical Data Processing Supervisor, Gulf Oil Corporation, Venezuela; 1976 - 1983: Exploration Data Processing Supervisor, Exploration Team Leader, Gulf Oil Corporation, Oklahoma City; 1983 - 1985: Supervisor, Subsurface Development Geology, Gulf Oil Corporation, Bakersfield; 1985 - 1991: District Development Geologist, Chevron USA, Inc., Ventura; 1991 - Present: Staff Geologist, Groundwater Technology, Inc., Ventura.

Professional Activities:
Pacific Section AAPG; Coast Geological Society; Chairman, Finance Committee, Pacific Section AAPG, 1992-1993; Secretary, Coast Geological Society, 1990 - 1992; Treasurer, Pacific Section AAPG Annual Convention, 1988.

CANDIDATES FOR OFFICE - PACIFIC SECTION AAPG

HERMAN B. SCHYMICZEK, Candidate for President-Elect

Present Position:
Branch Manager, EMCON Associates, Fresno, California

Education:
1981, California State University, Northridge, B.S. Geology; 1983, California State University, Northridge, M.S. Geology; 1985, California State University, Bakersfield, B.S. Petroleum Land Studies

Employment:
1979 - 1980: Exploration Geologist (Summer Hire), Getty Oil Company, Bakersfield; 1981 - 1984: Exploration Geologist, Getty Oil Company, Bakersfield; 1984 - 1988: Product Geologist, Texaco USA, Inc., Bakersfield; 1988 - 1989: Branch Manager, Dames & Moore, Bakersfield; 1989 - Present: Branch Manager, EMCON Associates, Fresno.

Professional Activities:
California Registered Geologist #4165; Oregon Registered Geologist #G1733; California Registered Environmental Assessor #711; National AAPG; Pacific Section AAPG; San Joaquin Geological Society; Association of Groundwater Scientists & Engineers; National Speleological Society; National & Golden Empire Chapter Member of the Air & Waste Management Association; National & Sierra Chapter Member of the Solid Waste Association of North American; Field Trip Leader, Pacific Section SEPM, 1981; Secretary, SJGS, 1984 - 1985; Vice President, SJGS, 1985 - 1986; President-Elect, SJGS, 1987 - 1988; AAPG National Convention Judge, Los Angeles, 1987; Program Director, SJGS Symposium, 1987; Co-Editor, SJGS Miscellaneous Publication #37, 1987; Technical Session Chairman, Pacific Section AAPG Convention, Bakersfield, 1991; Field Trip Co-Leader & Guidebook Co-Editor, Pacific Section AAPG Convention, Bakersfield, 1991; Board of Directors, Sierra Chapter, SWANA, 1993.

RICHARD W. BOYD, Candidate for Vice President

Present Position:
Geologist, Capitol Oil Corporation, Sacramento, California

Education:
1974, San Jose State University, B.A. Geology; 1976, San Diego State University, M.S. Geology

Employment:
1976 - 1988: Senior Geologist, PG&E Resources (Natural Gas Corporation of California), San Francisco; 1988 - Present: Geologist, Capitol Oil Corporation, Sacramento.

Professional Activities:
California Registered Geologist #3623; Certified Petroleum Geologist #3191; National AAPG; Pacific Section AAPG; Sacramento Petroleum Association; Speaker, AAPG Annual Convention, Calgary, 1982; North Coast Geological Society Delegate, AAPG Annual Convention, Calgary, 1982; Speaker & A. I. Levorsen Award Recipient, Pacific Section Annual Convention, San Diego, 1984; President, Sacramento Petroleum Association, 1990 - 1991; Secretary, Sacramento Petroleum Association, 1992 - 1993; General Chairman, Pacific Section Annual Convention, Sacramento, 1992.

DONNA M. THOMPSON, Candidate for Secretary

Present Position:
Senior Geologist, San Joaquin Energy Consultants, Inc., Bakersfield, California

Education:
1982, Stanford University, B.S. Geology

Employment:
1982 - 1985: Petroleum Geophysicist, Gulf Oil Exploration & Production Company, Bakersfield; 1985 - 1987: Petroleum Geologist, Chevron USA, Inc., Bakersfield; 1988 - Present: Senior Geologist, San Joaquin Energy Consultants, Inc., Bakersfield.

Professional Activities:
Pacific Section AAPG; San Joaquin Geological Society; National Ground Water Association; California Registered Geologist No. 5347.

DONNA L. MILLER, Candidate for Treasurer

Present Position:
Development Geologist, Chevron USA Production Company Inc., Bakersfield, California

Education:
1979, State University New York, College at Oneonta, B.A. Geology; 1982, Bowling Green State University, Ohio, M.S. Geology

Employment:
1982 - 1985: Exploration Geologist, Gulf Oil Company, Bakersfield; 1985 - Present: Development Geologist, Chevron USA Production Company Inc., Bakersfield.

Professional Activities:
Pacific Section AAPG; Geological Society of America; San Joaquin Geological Society; San Joaquin Geological Society Delegate for AAPG, 1990 - Present; Treasurer, San Joaquin Geological Society, 1991 - 1992.

PACIFIC SECTION AAPG FIELD SUMMARIES

GAMBLE POOL OF THE RIVER ISLAND GAS FIELD

by Bob Blackmur

STATISTICS

Discovery Well

Coastal "Gable" No. 1
Section 30, T.4N., R.5E., M.D.B. & M.
San Joaquin County, California
Total Depth 9,300 feet

Discovery Date

August, 1988

Initial Production

10,138 MCFGPD

Productive Zone

Upper Cretaceous Winters Formation

Trap

Stratigraphic Pinchout

Pay Depth

8,657 feet

Total Productive Wells

One (1)

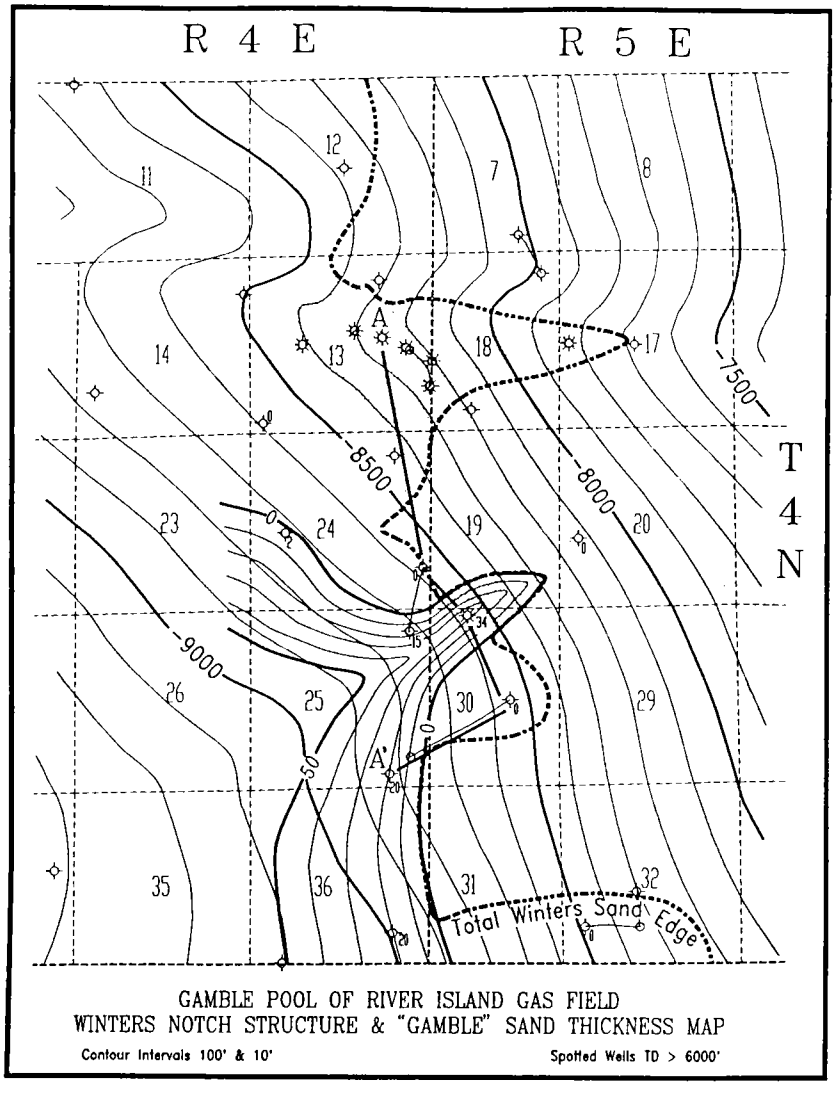
Cumulative Production as of July 22, 1992

2,153,385 MCF

INTRODUCTION

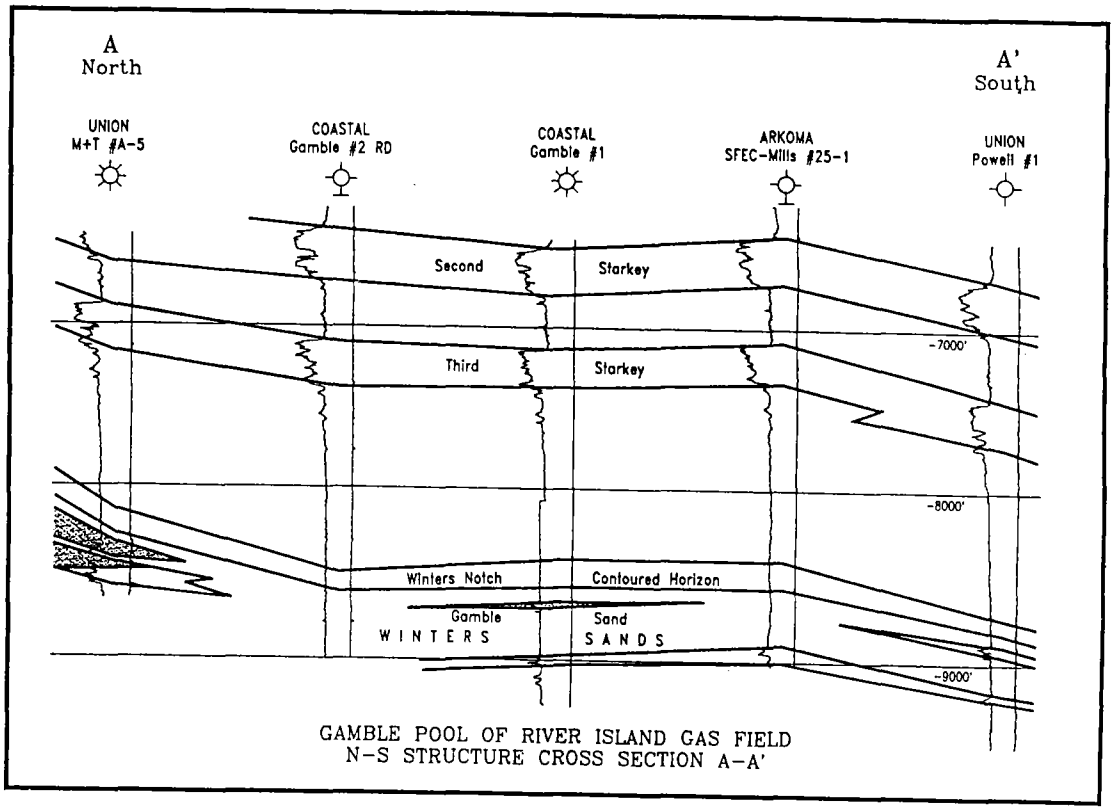
The Gamble Pool of the River Island Gas Field is located in the southern Sacramento Valley between the cities of Sacramento and Stockton. The single well field is a local stratigraphic trap of the Upper Cretaceous Winters sand at its eastern-most pinchout.

The discovery of the Gamble Pool was the result of a detailed study of the Winters sand distribution along its eastern pinchout edge. Subsurface sand thickness maps combined with regional structure maps identified several likely updip Winters "embayments" similar to River Island Gas Field's Staten Island Pool. This pool produces from three distinct Winters sands, based upon differing gas/water contacts, with cumulative production of over 39 BCF gas from six wells since its discovery by Brazos (now UNOCAL) in 1963. These sands total over 300 feet thick at the western side of the pool and extend over two miles to the east and updip defining an east-west oriented feeder channel of narrow width. Significant



GAMBLE POOL OF RIVER ISLAND GAS FIELD
WINTERS NOTCH STRUCTURE & "GAMBLE" SAND THICKNESS MAP
Contour Intervals 100' & 10' Spotted Wells TD > 6000'

differential compaction of shales to the north and south of the channel sands enhanced the subtle structural nosing. Proprietary seismic was shot over a Winters embayment lead two miles to the south of the Staten Island Pool and the stage was set for the drilling of the Coastal Gamble #1 exploratory well.



GAMBLE POOL OF RIVER ISLAND GAS FIELD
N-S STRUCTURE CROSS SECTION A-A'

STRUCTURE

The regional structure of the Winters formation on this east side of the basin is a relatively monotonous south-west dipping homo-cline as defined by a series of laterally extensive "bentonite" markers. The east-west trending Thornton Arch exhibits a pronounced structural nose at Winters level that combines with Winters sands pinching out to trap gas at the West Thornton-Walnut Grove Winters Pool. Three miles south is the aforementioned Staten Island Pool with differentially compacted Winters sands creating a pseudo-structural nose. For over twenty miles further to the south, the homocline is cut by several northwest-southeast trending down-to-the-northeast normal faults before it merges with the Stockton Arch with its associated Winters gas accumulation at Union Island. A detailed study of 28 dipmeters from Townships #3 and #4 reveal seven wells with shallow (less than five degree) anomalous counter-regional east and southeast dips of the "bentonite" beds above the Winters sands. Regional seismic confirms the presence of a deepseated structural flattening with locally subtle east dip. However, it is suggested that these counter-regional dips are the combined product of the noted structural flattening together with differential compaction of shales east of the Winters sand edge line.

STRATIGRAPHY

A recurring theme in the Sacramento Basin during Upper Cretaceous time is one of westerly prograding deltaic shelf, slope, and submarine fan/basin plain sediment deposition. Two of the most studied of these synchronous genetically-related depositional environments are the Campanian Kione-Forbes system, and the overlying Campanian-Maestrichtian Starkey-Delta Shale-Winters system. Deltaic Starkey sands spill over the shelf edge, normally by-passing the slope, and are redeposited as Winters sands with the youngest to the west and the oldest to the east; the latter were the object of the Gamble #1 exploratory well.

Overlying the Winters sand is the aforementioned 1,200 foot-thick Delta Shale (an unfortunate misnomer given its continental slope, not delta, depositional environment). Above lie three 300 - 450 foot-thick deltaic Starkey sands separated by several hundred foot-thick transgressive shales and ultimately capped by the regional H & T transgressive shale. Shelf to estuarine deposits of the Upper Cretaceous Mokelumne River Formation measure 1,400 feet thick unless eroded locally by the Paleocene Meganos submarine channel. The Gamble wells penetrated over 250 feet of Meganos shales overlain by 300 feet of regionally transgressive Eocene Capay shale. Overlying the Capay are 600 feet of Domengine shelf sands and 500 feet of combined Nortonville shale and Markley sands. These Eocene units are unconformably overlain by nearly 3,000 feet of undifferentiated Mio-Pliocene non-marine sediments.

HISTORY

Proprietary seismic shot over Coastal's prospective Winters sand embayment exhibited an anomaly that extended east and updip from wet Winters sand found in Texaco's Canal Ranch #1 and Sun's M & T eight wells. Amplitude versus offset study was not conducted due to the very poor signal-to-noise ratio, likely the result of substantial near surface peat deposits. However, the Coastal Gamble #1 well was drilled on this anomaly in August, 1988 and encountered 32 feet of Winters gas sand. The well flowed at an initial production rate of 10,138 MCFGPD with no water at 2,365 psi tubing pressure on 23/64 inch choke. The lack of any gas/water contact and virgin reservoir pressure defined a separated embayment and/or unique "Gamble" sand not encountered at Staten Island. First sales to the Pacific Gas &

Electric Company commenced in September, 1989 at a rate of 5 MCFGPD with a Btu content of 999.2 and negligible water.

Two months prior to the discovery well's pipeline hookup, the Gamble #2 was drilled 1,800 feet to the west-southwest and encountered 15 feet of wet "Gamble" sand 144 feet downstructure. The Gamble #2 was redrilled to the northeast 1,800 feet and failed to encounter any "Gamble" sand on strike with the discovery well. Subsequent wells by Vern Jones to the east and Arkoma to the south likewise missed the producing sand.

The current depositional interpretation invokes a narrow longitudinal sand body perhaps a few hundred feet wide and a mile long, more the configuration of a large gully than a substantial submarine fan.

RESERVOIR

Average log porosity for the "Gamble" sand is 27 percent with a calculated water saturation of 35 percent. Initial reservoir pressure was 4,210 psi with a temperature of 180 °F. Volumetric calculations suggest a reservoir averaging 15 feet thick and 116 acres in size. Water production has averaged less than two barrels per day and condensate about two gallons per day. The reservoir exhibits classic pressure depletion with the Gamble #1 going on compressor in December, 1990. The well has produced 2.15 BCF of gas through July, 1992 with an estimated additional 0.4 BCF recoverable reserves.

***Bob Blackmur** is a Staff Geologist with the Coastal Oil & Gas Corporation in Denver, Colorado.*

MEMORIAL TO MASON HILL

Discoverer of Oil in Cuyama Valley

Mason Hill always credited his success as a geologist to serendipity and to his teachers. By a stroke of luck, A. O. "Woody" Woodford was Mason's advisor when he arrived at Pomona College in 1922 to register for classes. Woody suggested that Mason should fulfill his science requirement by taking a course in the new geology department, which he did. Mason was hooked. He graduated in 1926 and went to work at the Black Hawk Gold Mine in the San Bernardino Mountains, because he was unable to afford graduate school. Woody learned about this and established a "scholarship fund" - really a personal loan - that enabled Mason to start his graduate work at the University of California, Berkeley.

Woody was always Mason's mentor, and Mason's respect for Woody never faltered. Several years ago, Mason lectured at Pomona College on one of his favorite subjects, the San Andreas Fault, and he caught himself making a controversial point. He deferred, saying, "But my professor may want to correct me." This, from a man who was 82, referring to his professor of 64 years before . . . who was 96 years old and sitting attentively in the front row of the audience. Mason's respect for his professor demonstrates the potential influence of everyone who teaches.

Mason worked for Shell Oil Company in the late 1920's and early 1930's, and he was fortunate to be able to use mapping he had done for Shell as part of his master's thesis at the Claremont Colleges and his Ph.D. dissertation at the University of Wisconsin. He taught at a junior college for several years before returning to Shell from 1934 to 1937. He then joined Richfield Oil Corporation and was chief geologist when the Swanson River strike was made on Alaska's Kenai Peninsula in 1957. He was also instrumental in finding the Prudhoe Bay fields on the North Slope. He was later manager of international exploration for Atlantic Richfield until his mandatory retirement in 1969.

Mason always maintained a deep loyalty to Atlantic Richfield. When I was finishing my Ph.D., geology departments were thick with oil-company recruiters. I suddenly found myself with an impressive job offer from one of the majors. When Mason heard about this, he insisted to Dallas and me, "If you're going to work for an oil company, you should work for a good one." He started scribbling on a piece of paper, and added, "Here. Call this number and tell Harry that I said you should call him. He'll talk to you. After all, I hired him when he was a youngster."

So Dallas dialed the number. Eleven layers of receptionists and clerical staff peeled away when he said, "Mason Hill suggested that I call." Eventually he heard, "President's Office. Mr. Jamison will be right with you." We had not guessed that "Harry" was Harry Jamison, President of ARCO Exploration.

Some geologists retire and give up their boots and hammers. Not Mason Hill. Mason was more productive in retirement that many people are in a lifetime. Although Mason used his experience and knowledge to reflect on some of the larger issues in geology (as in his 1980 paper in the Geological Society of American Bulletin, "The San Andreas Fault: History of Concepts"), he also remained excited about new events and ideas. An earthquake anywhere in the world caught his interest, and he always developed theories to explain them. If he was close, he headed for the epicenter to look for surface rupture. For more distant seismic events, he would rely on news reports, CNN, and reports from friends who could get into the field.

Mason was always generous with his ideas and his time. When he was helping the Department of Geology at Whittier College find suitable field areas for its January field geology course, he took the faculty members to the Cuyama Valley in Central California. On the drive there, he was identifying formations faster than his colleagues could find them on a map. And well he might. He had named many of the units.

In the 1940's, several oil men announced that they were certain that the Cuyama Valley held no oil or gas. So sure were they that they agreed to drink any petroleum that was ever discovered there. There's no record that they were ever forced to comply. The Russell Field that Mason found in the Cuyama Valley in 1947 is still producing. Even that discovery shows Mason's blend of serendipity and skill. The original drilling site had to be moved a hundred yards because of an access problem. The geologists realized later that if they had drilled in the original location, they would have missed the structure altogether. Mason attributed this to good luck, too. When the Russell Field was discovered, the geologists had to drive 75 miles back to Bakersfield to celebrate. Today, generations of geologists have had a beer and a buffalo burger at the Buckhorn Cafe in the town on New Cuyama that Richfield built near the site of the discovery.

Mason's major contributions to the geologic literature include a 1947 paper for the American Association of Petroleum Geologists in which he introduced the terms "right lateral" and "left lateral" in strike-slip faulting. In 1953, he and Tom Dibblee published a paper is the Geological Society of America Bulletin in which they proposed up to 350 miles of offset along the San Andreas Fault. This revolutionary concept was one of the discoveries that led to the theory of plate tectonics.

(continued on Page 11)

THE DIBBLEE FOUNDATION

The First Ten Years

By the time this report sees the light of printing the Thomas Wilson Dibblee, Jr. Geological Foundation will have been in business for ten years and Tom Dibblee for 81. It has been a decade of remarkable achievement and success.

Conceived and established in 1983, by a coterie of Tom Dibblee's close friends including among others, John Curran and Ted Off, both former Presidents of the Pacific Section, the Foundation was initially funded by a grant from the Pacific Section of $30,000. Since then we have received more than $500,000 from individual and corporate donors, map sales and other sources. An important contribution came from the City of Los Angeles in the form of a $92,000 contract to provide a consistent bedrock map of the City. These funds gave us the luxury of devoting our energies to the westerly portions of the Santa Monica Mountains where we knew our map sales would be significant. Indeed, we have arrived at the milestone where our map sales are approximately equal to our printing costs.

We are especially pleased with and proud of our printing process adapted by our Editor, Helmut Ehrenspeck, from the technique which brings you the Sunday comics in living color. We still publish our maps in black and white, but nearly all our sales are maps in color, which greatly facilitates geologic understanding. In simple terms, Helmut imprints Tom's geological details on a sheet of clear acetate, accents them with comic strip paints and prints the finished map using a laser scanning device. The result is a map of high quality, easy to read and made at comparatively low cost.

In ten years we have published 42 maps covering 57 seven and one-half minute U.S.G.S. Quadrangles in southern California. Our maps depict Tom Dibblee's interpretations of geology of the southerly and westerly portions of Santa Barbara County, the southerly half of Ventura County and a large part of southwestern Los Angeles County. These maps, covering literally thousands of square miles, constitute only a small fraction of Tom Dibblee's California mapping.

Over the course of time we have experimented in our attempts to preserve Tom Dibblee's work and artistry. We began with black-and-white prints exclusively but quickly abandoned them in favor of Helmut's color. Of necessity our maps have been different sizes because of printing press limitations. Our early maps did not show cross-sectional interpretations of subsurface geological conditions; we now include them. Our marketing efforts have been primitive and need to be perfected. Nevertheless, the Foundation has spent less than half a million dollars for all costs in its production of 42 maps of unmatched quality. Thus, our cost per map averages about $11,000. On the basis of recent performance we estimate our new maps are costing less for a production run of 1,000 color prints. What a bargain!

The Dibblee Foundation will continue its work in the coastal regions of southern California, prominently in those areas where we can expect promising map sales to sustain our efforts. Temporarily, we have the resources to carry on our program throughout 1993. Our next maps will be in central Santa Barbara County and the developing areas westerly and northerly of the City of Los Angeles. Notwithstanding our present comfort level, keep us in mind as your favorite charity.

Arthur O. Spaulding
President, Dibblee Foundation
President, Pacific Section 1972 - 1973

DELEGATES' CORNER

The Delegate's Job Description

Many AAPG members like myself may have wondered why the Association has Delegates and what are the Delegates' duties. The Delegates are part of a large and complex governing system that includes an Executive Committee, the House of Delegates, and the AAPG members themselves. The Executive Committee handles the administration and application of the Association's Constitution and Bylaws. The House of Delegates is the legislative branch of the AAPG and has the responsibility to modify, delete or add Bylaws. The House also recommends to adopt Constitutional amendments before they are voted on by the active members.

AAPG Delegates are active members of the national Association elected by the members from their affiliated (local) Society. Terms are for three years. One Delegate is elected for each 70 active members. The Delegates represent the interests of the local Societies (such as the San Joaquin Geological Society) as well as the active members within the Societies. The AAPG Sections (like the Pacific Section) do not elect Delegates, but are represented through the local Societies.

Delegates are local AAPG representatives that connect the membership with the national organization. Individual members can bring influence to bear on the affairs of the AAPG through the Delegates. Delegates report the local concerns and views to the House of Delegates. Delegates report back to the members all important acts of the House and Executive Committee through announcements at Society meetings and through newsletter columns.

Delegates must become familiar with the Rules and Procedures of the House of Delegates and with the Constitution and Bylaws of the Association. Delegates should be acquainted with the Association's current policies and programs as well as its customs and traditions.

The AAPG asks Delegates to review the personal, professional and moral qualifications of applicants in their area for AAPG membership, and also process Certification information when requested. A Delegate should get acquainted with each new applicant, make appropriate inquiries of knowledgeable persons other than sponsors, and compare opinions with the other Delegates from the same Society.

The Delegate should be present at the Annual House Meeting and vote upon all Association business that comes before the House. A duly elected Alternate may represent the local Society if the Delegate is unable to attend. In case an Alternate is not available, the Society may appoint a substitute Alternate.

Societies having two or more Delegates meet regularly and select a Chairman. Meetings to discuss Association business should precede those of the local Society. The local Society President is invited to attend. Additional meetings may be necessary to review membership applications and to prepare for the Annual National Meeting. In the San Joaquin Geological Society, Delegates meet about every other month prior to the Executive Council meetings.

S. A. Reid
January 4, 1993

DEDICATION: COLES LEVEE ECOSYSTEM

On October 7, 1992, ARCO Oil & Gas Company dedicated a 6,000 acre native habitat area encompassing their Coles Levee Oil and Gas Field as the Coles Levee Ecosystem Preserve. Some 250 guests of ARCO - newspeople, environmentalists, and public officials, including California Governor Pete Wilson - converged on the property, near Bakersfield, California.

ARCO deeded a conservation easement over the property to the California Department of Fish and Game. The company will manage the preserve, which is a significant biological area with a variety of rare and endangered animals. Among the animals living in the area inlcude kangaroo rats, badgers, falcon-like kestrels and bobcats.

ARCO will exercise special care in operating the aging field as a preserve. It will be off-limits to housing and agriculture. In return, the State of California will allow ARCO to explore other parts of the San Joaquin Valley.

ELK HILLS FIELD PRODUCES ITS 1,000,000,000th BARREL OF OIL

The Elk Hills Field likes within the boundaries of the Naval Petroleum Reserve No. 1 (NPR-1) about twenty miles west of Bakersfield.

According to the U.S.G.S. Report on NPR-1, "The field extends over part of a large anticlinal trend whose surface expression is a line of hills about seventeen miles long and seven miles wide. The Elk Hills Field is classed among the giant petroleum fields of the world." It is the fifth field in California and the third field in Kern County to produce 1,000,000,000 barrels of oil.

The Standard Oil Company of California Hay No. 1 well, drilled in 1919 on its property in the central part of the reserve, is generally regarded as the discovery well. This well produced oil from the Shallow Oil Zone, and with rapid development by Standard Oil, production reached 60,000 barrels per day by 1921.

Since the beginning of the original Unit Plan Contract on November 20, 1942 until September 15, 1992, the U. S. Department of Energy has received a total of 641,250,964 barrels of oil produced from the Elk Hills Field. That production has been transferred to the following recipients: the private sector bought 500,759,249 barrels, the Strategic Petroleum Reserve in Louisiana received 2,141,966 barrels, and 138,349,749 barrels were transferred to the Department of Defense.

The Chevron U.S.A. equity portion during this time period was 197,674,870 barrels.

Prior to the Unit Plan Contract, the Elk Hills Field produced 160,764,135 barrels of oil that were delivered to the government, Chevron and others.

Of the 1,000,000,000 barrels of oil that the Elk Hills Field has produced, 999,903,317 have been received by the government, Chevron and other owners, and 96,683 have been used during operations.

Crude oil production from the Elk Hills Field currently averages just under 70,000 barrels per day.

Amazing Facts

- Seventh Largest Producing Oil Field in the U.S.A.
- Fourteenth Largest Oil Company Based on Liquids Produced
- Currently Producing 70,000 BOPD, 320 Million CF/D Gas, 450,000 CPD Gas Liquids, 250,000 BWPD, 1,100 Wells
- Field Operating Costs at $2.50/BO
- Oil Sales Price at $17.00/BO
- Annual Cost at $170 Million
- Annual Revenue at $500 Million
- Operating 100,000 Hp of I.C. Gas Compression
- Operating Half of the Gas Throughput in California
- Producing Half of the NGL Products in California
- Employees: BPOI - 750, U. S. DOE - 60, CUSA - 20, Contractors - 750
- One Billion Barrels is:
  Twenty (20) Tanker Trucks Wide from Los Angeles to New York City
  Producing One Barrel per Minute Would Require 1,902 Years to Produce One Billion Barrels

MEMORIAL TO MASON HILL

Discoverer of Oil in Cuyama Valley

(continued from Page 9)

In 1988, Mason edited the Centennial Field Guide for the Geology Society of America's Cordilleran Section in the Decade of North American Geology Project. In the process, he delighted in bringing the participating geologists together, as authors, editors, and reviewers, and introducing people who had not met before. This was typical. Geologists throughout California owe their introductions to Mason Hill.

In 1983, Mason wrote, "Serendipity has accompanied me all the days of my geological life . . . I can't remember any geologic activities or responsibilities that I did not enjoy - geology is fun! Accidentally, I made a very wise choice of geology as a career." And both the science of geology and the lives of many geologists are richer for it.

More geologists attended the memorial service in March, 1992 for Mason Hill than are present in a typical Geological Society of America session. The guiding principal in planning the service - and other events in his honor - was that Mason would have enjoyed himself. Friends and family, gathered on the slopes of the Puente Hills near the Whittier Fault overlooking the Los Angeles Basin, told stories about his love of life, geology and dominoes. Arguably, in that order.

And in another 100 million years, the Puente Hills will be about 550 miles to the north. Just like Mason said they would be.

Lisa A. Rossbacher
Reprinted with Permission from the Author & Geotimes (June, 1992, Page 36)

REQUIEM

Night is day under the illumination of rig lights. Drilling has stopped and the process of coming out of the hole is now in progress. The deep bellow of the diesels breaks the cacophony of rig sounds, draw works hum and another stand of pipe is out. Mud log shows are encouraging, maybe on this one I can retire in the lap of luxury. Investors pace as expecting fathers in the air of anxiety. I look out from the drill site into the valley; peaceful, quiet, amazing how quiet it is such a short distance from all this mechanical activity.

An hour passes and the loggers are rigging up. My anxiety increases knowing two years of work are hinging on success or failure from the results of the logs. Again I peer out into the peace of the midnight valley and breath a long sigh. A role of the dice, a risk one takes, the logs are out and fate awaits.

Resistivity, crossover, delta T, are the words softly canted. Smoke from a cigar drifts through the company trailer in layers, the air is still. All eyes peer over the logs as if sacred, all knowing. Tense moments, disappointed non-believing looks; it's over. "Run pipe" is heard in a distressed way. It's not there, "Ok, maybe enough to light up your Bic a couple of times".

A quiet resolve, the sunrise cast its golden glow as investors leave. The trailer is empty, quiet, still. As I reached for the cellular phone, two flies buzzing was the only requiem heard. "Halliburton, bring out cement, we've got one to abandon".

John W. Howe
October 9, 1992

NOTICE FOR GEOLOGISTS WHO PRACTICE GEOLOGY IN KENTUCKY

Kentucky's new law for registration of professional geologists became effective July 14, 1992. This law requires the registration of all geologists offering their professional services to the public in Kentucky. A "grandfather" period for applicants extends through January 9, 1994. For information and application forms, please contact: Kentucky Board of Registration for Professional Geologists, 228 Mining and Mineral Resources Building, University of Kentucky, Lexington, Kentucky 40506-0107.

RECOMMENDED READING

U. S. GEOLOGICAL SURVEY

Open File Report 90-0962: Paleoenvironmental Analysis of Latest Quaternary Levee Deposits of Monterey Fan, Central California Continental Margin; Formaninifers, and Pollen, Core S3-15G (235 Pages), by M. L. McGann, 1989. Prices: $35.50 for paper, $4.00 for microfiche.

Outside Publication 56: Resources of Heavy Oil and Natural Bitument World Wide, by R. F. Meyer, et al.

Outside Publication 101: Coarse-Grained Deltaic Sedimentation in a Miocene Strike-Slip Basin, California Coast Ranges, by J. A. Bartow

Outside Publication 107: Depositional Cycles in the Pliocene Parisima Formation: Possible Evidence of Sedimentation Across Submerged Deltaic Platform on a High-Energy Coast of Central California, by H. E. Clifton

Outside Publication 124: Place of Origin of the Salinian Block of California Inferred from Conglomerate Clast Composition, by V. M. Seiders, et al.

AAPG BULLETIN

Vol. 76, No. 11, November, 1992

Cenezoic Attenuation Detachment Faulting: A Possible Control on Oil and Gas Accumulation in East-Central Nevada (Page 1,165), by C. T. Walker, et al.

Forced Regression in a Sequence Stratigraphic Framework: Concepts, Examples and Exploration Significance (Page 1,687), by H. W. Posamentier, et al.

BOOKS

Economic Geology, U. S., edited by H. J. Gluskoter, et al., 1991, Geology of North America, Volume P-2 (622 Pages), Published by the Geological Society of America

BOOK REVIEW

Computer Graphics in Geology: Three-Dimensional Computer Graphics in Modeling Geologic Structures and Simulating Geologic Processes (Page 65), by A. Zolnai

GEOLOGICA.L SOCIETY OF AMERICA

Vol. 104, No. 10, October, 1992

Nd-Sr Isotopic Geochemical and Petrographic Stratigraphic and Paleotectonic Analysis: Mesozoic Great Valley Forearc Sedimentary Rocks of California (Page 1,624), by A. M. Linn, et al.

GEOBYTE

Vol. 7, No. 5, October/November

Mapping with Fractal Geometry (Page 18), by T. Roney

Designing Petroleum Industry Presentation Maps (Page 24), by E. J. Naylor, et al.

Mathematical and Logical Manipulations of Grid Models (Page 31), by D. B. McEachran

Using the LAS Format - Summations II (Page 67), by R. Y. Elbhick

GEOLOGY

Vol. 20, No. 10, October, 1992

Lomonosov Ridge - A Double-Sided Continental Margin (Page 887), by W. Jokat, et al.

Vol. 20, No. 11, November, 1992

Retreat of the Front in Prograding Deltas (Page 967), by T. Muto

MAPS

Geologic Map of Catalina Core Complex and San Pedro Trough, by W. R. Dickinson, 1992, Contributed Map CM-92-C, Scale: 1:125,000. Available from the Arizona Geological Survey, Tucson, Arizona. The price is $11.00 for folded and $12.00 for rolled.

Russ Robinson / Pat Bell

DEADLINE FOR SPRING 1993 ISSUE APRIL 1, 1993

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

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PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

of the Pacific Section
American Association of Petroleum Geologists

SPRING 1993 No. 2

PRESIDENT'S COLUMN

The 1993 Pacific Section AAPG Convention is now history - fairly recent history, geologically speaking!

The Long Beach event was a definite success, due to the attendance of more than 650 people, many of whom opted for the one day registration. Special thanks to convention organizers, including **Don Clarke, Bob Menzie, Mike Mulhern**, and many others who contributed time and effort.

Early tallies show the Long Beach event was an economic success - better than last year's Sacramento event, which yielded a disappointing return after bills were paid. The yearly convention is Pacific Section's largest funding source; we anxiously await this year's final figures!

Please note the ballot and membership renewal forms on Page 11 of this newsletter, and send them in today! Use the membership renewal form to update your directory/address information and send in your dues, which pay to print the newsletter and the directory. Honorary members need to send these in, too, to update information.

Co-editors **Tom Berkman** and **JoAnn Conard** thank you for your contributions of articles, letters, poems, cartoons and drawings for recent newsletters. If you submit materials previously published in a book or magazine, please secure documentation from author or publisher of our permission to print an excerpt.

Careful planning has allowed us to print "Structural Geology of the Sacramento Basin" (MP 41) with the help of Robert Hacker Memorial Publication Fund. Look for this publication at your local San Joaquin or Coast Geological Society meeting or contact Publications Chairperson **Dan Olson** at (805) 321-4083.

Paul D. Hacker, President
May, 1993

PROPOSED CERTIFICATION FOR HYDROGEOLOGISTS IN CALIFORNIA

Legislation and regulations now in the works would create specialty certification of hydrogeologists by California's Board of Registration for Geologists and Geophysicists. These actions follow several years of careful study by the Board and its Professional Affairs Committee (PAC). Public hearings during this process have heard testimony from the full spectrum of geoscience professionals and related engineering specialties.

Senate Bill 433, being introduced by Senator William Craven, would provide for a "grandfathering" period similar to those in effect at the introduction of registration for geologists and geophysicists and of certification for engineering geologists. "Grandfathering" allows qualified, experienced professionals to become registered or certified without examination. The bill provides that "grandfathering" for hydrogeologists will be open only until January 1, 1994.

A public hearing before the PAC was held on March 24th to take testimony on the proposed regulations that would implement the hydrogeologist specialty. Written comment may be submitted to the Board until May 8. Geologists who now are (or later may be) practicing in this field will be especially interested in the specific definition of hydrogeology and the requirements proposed for this specialty. These are to be added to Title 16, Chapter 29, of the California Code of Regulation.

Definition - to Section 3003, add Subsection (h)

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

(continued on Page 9)

COMING EVENTS - BLM

Introduction

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

These trips are recommended for teachers and can be taken for in-service continuing education credit through California State University, Bakersfield for $25.00 per unit.

The field trips are conducted using buses and vans. No private vehicles are used. A field guide is prepared for each trip which includes maps and directions which can be used by anyone for self guided investigation of the geology along the field trip route. Field trip registration is generally $15.00 per person per day. To register, contact Frank Wilkerson at (805) 861-4210.

Bakersfield to Point Sal — Sat. July 10

The geology of the Santa Maria area is considered with stops at Pt. Sal and Celite's diatomaceous earth mine in Lompoc. Plate tectonics and continental accretion are topics of discussion.

Cerro Gordo Mining District — Sat. August 7

The geology, mining activity and mining history of the So. Inyo Mountains is investigated. Stops are made at Little Lake, Lone Pine, Olancha, and Keeler. The mining camp of Darwin is also visited.

Piute Mountains — Sat. September 11

The mining history of the Piute Mountain and Lorrain Mining Districts is covered. Stops include the Golden Cowboy, Zenda and Bright Star Mines.

Owens Valley-Mono Basin — Sat./Sun. October 16-17

Water management, glacial and volcanic geology are the main topics of this field trip. Stops include Cinder Hill, Owen's Lake, Alabama Hills, Mazorka Canyon,. American Perlite Mine, Tinnemaha Reservoir, June Lake, Devil's Post Pile, Mono Lake and Bodie State Park.

Geology of the San Joaquin Valley:
Eastside Stratigraphy — Sat. November 13

This trip examines the Bena fossil beds and includes a display of core at Bakersfield College. Topics include the Kern River, Round Mountain Fault, Kern Front Fault, 1952 Tehachapi-Arvin-Bakersfield Earthquakes, Hazardous Material Disposal and the Olcese Turretella Beds.

Geology of the San Joaquin Valley:
Westside Stratigraphy — Sun. December 5, 1993

The geology of Wheeler Ridge, White Wolf Fault, Maricopa and McKittrick Brea Pits, Oil Mining (diatomite), Lake View Gusher, Elk Hills Naval Petroleum Reserve and South Belridge oil field are discussed. Includes a display of core at the West Kern Oil Museum.

San Andreas Fault:
Gorman to Wallace Creek — Sat. January 8, 1994

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

SAN JOAQUIN GEOLOGICAL SOCIETY
1993 - 1994
ELECTION RESULTS

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DELEGATES 1991 - 1994

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DELEGATES 1992 - 1995

Donna Miller, Chevron USA
Tony Reid, Bechtel

San Joaquin

Suggestions for meeting speakers or topics should be addressed to Bill Bazeley at (805) 325-5746.

The meetings are held at the American Legion Hall at 2020 "H" Street in Bakersfield. Attitude adjustment starts at 6:00 p.m. and dinner is served at 7:00 p.m. For more information and reservations please contact Terry Thompson at (805) 763-6322.

Los Angeles

Luncheon meetings are held at noon on alternate months. Meetings are held at UNOCAL Center, California Room, 1201 West Fifth Street, Los Angeles. Visiting geologists and friends are cordially invited.

For reservations or information, please contact Reggie Moore at (714) 455-4080.

Northwest

For suggestions or question, please contact Lanny Fish at (603) 382-0825, Barbara Portwood at (503) 287-2762, or any other member of the NWPA Program Committee: Phil Brogan, Harry Jamison, Paul Dudley or Nancy Ketrenos.

Coast

The Dibblee Foundation will have all maps on sale for a very special price.

June 15 meeting: Richard Slade, Richard C. Slade & Associates, Geologic and Hydrogeologic Perspectives Past and Present, Northwestern South America and the Galapagos Islands.

Meetings are held the third Tuesday of every month. Social hour is at 6:00 p.m., dinner at 7:00 p.m. at the American Legion Hall in Ventura. The address is 83 South Palm Street. For reservations please contact Groundwater Technology's Receptionist at (805) 644-9811 **by 10:00 a.m. at least one day before the meeting.** Reservations are required to guarantee dinner.

COMING EVENTS

UC Extension to Offer Hazardous Materials Management Certificate in Summer Intensive Program

Santa Clara, CA - University of California Santa Cruz Extension will offer the highly respected UC Extension Hazardous Materials Management Certificate in an intensive six-week format between July 19 and August 27, 1993.

Autocad For Geology

A three day short course on using AutoCAD for Mining, Geology and Environmental mapping and other applications will be held at several locations during 1993. The dates and locations are as follows:

April 28 - 30, 1993, Lexington, KY
May 3 - 5, 1993, Vancouver, Canada
May 19 - 21, 1993, San Francisco, CA
June 23 - 25, 1993, Salt Lake City, UT
August 25 - 27, 1993, Anchorage, AK
September 15-17, 1993, Philadelphia, PA
October 6 - 8, 1993, St. Louis, MO

For more information or to register, contact Gibbs Asociates (303) 444-6032.

Clays and the Environment will be one of the special symposia to be held September 25-30, 1993 in San Diego at the annual Clay Minerals Society meeting. Papers are being solicited that pertain to: 1) geotechnical properties of clays; liquefaction, role in landslides, earthquake effects, foundation stabilization, containment barriers, 2) clays and environmental contaminants; effect on contaminant transport, interaction with hazardous and toxic wastes, role in remediation and treatment, and 3) silica and silicates; their role in human and animal health. The deadline for abstracts is June 1, 1993.

Hydrothermal clays, industrial applications of clay minerals, and teaching clay mineralogy will be the subject of other symposia and special sessions. Other aspects of the mineralogy and physical and chemical properties of clays will be included in general sessions.

Further information regarding the meeting may be obtained by contacting Dr. Richard W. Berry, Dept. of Geological Sciences, San Diego State University, San Diego, CA 92182-0337, (619) 594-5586. Either Dr. Roger L. Burtner or Dr. Marion G. Reed, P.O. Box 446, La Habra, CA 90633-0446, (310) 694-7516 and (310) 694-7319, respectively, should be contacted regarding contributions to the technical program.

- Roger Burtner, Technical Program Co-chair

Linear velocity functions and the effect of mentors on the oil industry

by: Wayne Tolmachoff
District Geophysicists
DEKALB Energy

Many explorationists believe they can see hydrocarbons directly on seismic date. Others are not so skilled. These explorationists perform the painstaking work of picking formation tops from logs, picking times from seismic data and ultimately creating an integrated structure map, one that incorporates information from all well and seismic control. The integration of well depths and seismic times is not a trivial process. There are perhaps as many methods to do this a there are people doing exploration work. Each develops their own techniques biased by their experience. One of the methods I learned early in my career, and one that I still employ often, is the use of linear velocity functions. I first learned this technique as a new hire at Texaco. Although individuals were involved in teaching me the method, Ivan Scherb, who served as my mentor, did the most to make me understand the technique. I would like to honor his teachings with this discussion.

As a first step in learning this method, let's look at velocities derived from a sonic log for the White Shield Gridley 1 well, location in Sec. 1, T5N, R1E in Solano County. This well is close to the geographical center of the state. The graph shows a multitude of high-velocity zones, each just a few feet thick, which are results of calcite "bones" in the well. There are other zones displaying velocity differences that have thicknesses ranging from a few hundred to a few thousand, which are generally shaley or sandy units. The faster units tend to be sandier, although many exceptions to this can be found. There is also a shape to this velocity curve represented by a sloping straight line, as shown. This is the linear velocity equation that is used for the depth conversion. The calculation of this linear velocity function is easily performed by a spreadsheet computer program, which performs a least-squares fit to the date (I must apologize at this point to the geologists for including equations in this article. I know many of you chose geology as a major to avoid taking calculus in college. Geologists avoid using math until they begin consulting, when potential overriding royalties become their focus). From this velocity curve the straight line equation is

$$V = 5482 + .660 \times Z$$

with Z being depth below surface in feet and V is velocity in feet per second. It is important to note that a surface datum is used, since the velocities are dependent on the amount of overburden.

Differences exist between velocities measured by sonic logs and the velocities recorded by seismic. In addition, we seldom log behind surface casing. To compensate for this, it might be necessary to record a check shot survey. A check shot survey provides more precise information to relate seismic times to well depth. There are over 500 velocity

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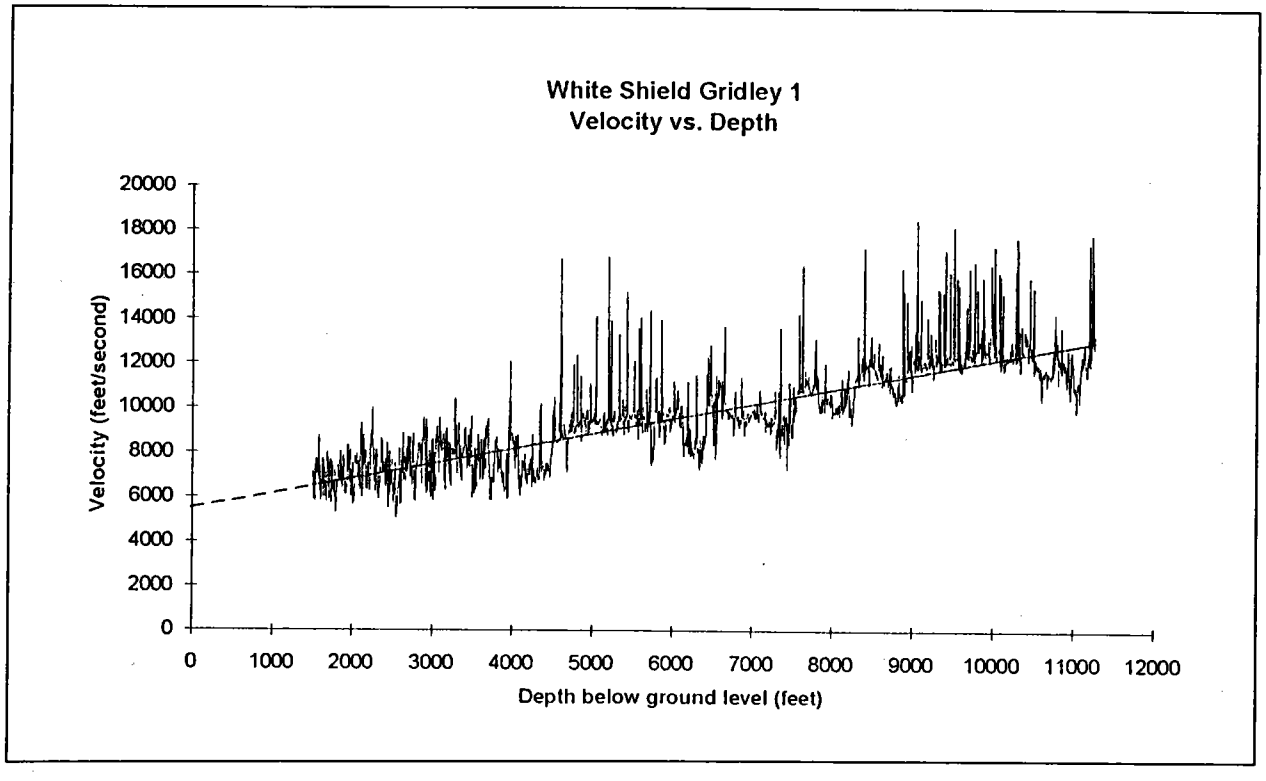

(continued from Page 4)

surveys that are part of the Cooperative Well Velocity Surveying Group, and the velocity survey for the White Shield Gridley No. 1 is one of these. Seventeen levels were recorded in the survey, and using a variation of the least squares fit, we can calculate an improved velocity function of

$$V = 5985 + .580 \times Z$$

This equation mimics the "California" linear velocity function taught to me by Ivan

$$V = 6000 + .6 \times Z$$

This equation is also published in my college geophysics textbook (Dobrin, Milton B. 1960. Introduction to Geophysical Prospecting. McGraw-Hill. p. 78-79), where it is called the Gulf Coast function. Can we assume this equation might be a good approximation for any clastic filled Tertiary basin?

What good is all of this? If you have a programmable pocket calculator, you can carry around a good-almost-everywhere time to depth conversion routine. Unfortunately, relating time and depth is <u>not</u> a straight line. The linear velocity equation ends up being a differential equation relating time and depth, and calculus is necessary to solve it. (I won't include the solution here, but if you are interested, it will probably appear in a future issue of the Pacific Coast SEG newsletter.) The equation relating depth and time is

$$Z = \left(\frac{6000}{.6}\right)\left(e^{(T+2x.6)} - 1\right)$$

where Z is depth in feet and T is two-way time in seconds. This equation can also be twisted and turned to allow calculations of times from depths

$$T = \frac{2}{.6}\ln\left(\frac{Zx.6}{6000} + 1\right)$$

(Geologists need not worry what "e" and "ln" are. They are on your calculator, so just go ahead and use them. Trust me.) The results of these equations are included in the following tables relating times and depths.

California Times and Depths using V = 6000 + .6 x Z

T seconds	Z feet	Z feet	T feet
0.000	0	0	0.000
0.250	779	1,000	0.318
0.500	1,618	2,000	0.608
0.750	2,523	3,000	0.875
1.000	3,499	4,000	1.122
1.250	4,550	5,000	1.352
1.500	5,683	6,000	1.567
1.750	6,905	7,000	1.769
2.000	8,221	8,000	1.959
2.250	9,640	9,000	2.140
2.500	11,170	10,000	2.310
2.750	12,819	11,000	2.473
3.000	14,596	12,000	2.628
3.250	16,512	13,000	2.776
3.500	18,577	14,000	2.918
3.750	20,802	15,000	3.054
4.000	23,201	16,000	3.185
4.250	25,787	17,000	3.311
4.500	28,574	18,000	3.342
4.750	31,579	19,000	3.549
5.000	34,817	20,000	3.662

The geological staff at DEKALB uses this table frequently, where it is called the Ivan Scherb table.

Of course, using this table will not make perfect correlations between times and depths, but using variations of this method are very useful. There are also some high-tech applications of this method. Residual calculations where the actual values are subtracted from the linear function could help us understand overpressured zones. Velocity functions also make it easy to perform 3-dimension depth migrations on seismic workstations.

In conclusion, even though this method has been around for years, I wonder how many explorationists are cognizant of it. With the reduction of staff size and a focus on productivity, some explorationists may not be learning all the skills necessary to do their job. I consider myself lucky that I was able to learn many tricks-of-the-trade from mentors like Ivan Scherb.

DELEGATES' CORNER

In preparation for the annual meeting of the House of Delegates in New Orleans on April 25, 1993, the Chairman of the House sent to all Active members a letter stating the proposed amendments to the Constitution & Bylaws of the Association, which was voted on at the annual meeting. Amendments to the Constitution must first be approved by a simple majority vote of the House of Delegates present and voting at the annual meeting. Amendments to the Constitution must first be approved by a simple majority vote of the House of Delegates and then by a 2/3 majority vote of the Members responding by mail ballot. Amendments to the Bylaws are made by a 2/3 affirmative vote of the Delegates present and voting at the annual meeting of the House of Delegates. There are five proposed modifications for the 1993 meeting:

- Recommended changes to the section of the Constitution addressing the purposes of the Association are an attempt to encompass the increasing number of technical specialties and disciplines of AAPG members by simply changing the wording to include "subsurface fluids" and "in an environmentally sound manner."

- The following recommended change to the Bylaws was submitted by petition from 50 active members. The gist of the recommendation is that if two or more candidates for the office of Editor are submitted to the Advisory Council, the Council would be required to forward at least two candidates to the Executive committee regardless of whether or not they had a majority vote from the Council. The Executive Committee would then be required to approve two or more candidates for the office of Editor provided they are all qualified. As currently written, one or more candidates for the office of Editor can be forwarded to the Executive Committee if they can obtain a majority vote of the Advisory Council.

- The proposed change to the House of Delegates would provide a mechanism whereby members of the Association living in areas of the world where they cannot be assigned to an existing affiliated society would be able to form groups and elect representatives to the House of Delegates. The number of Delegates wold be determined by the same method used for affiliated society delegates.

- The amendment to the Advisory Council would grant Division presidents the authority to appoint an alternate with voting privileges to attend specific Advisory Council meetings except meetings of the Nominating and Honors and Awards Committees.

- The last change is straight forward and proposes to raise the upper limits within which the executive committee can raise dues. It does not raise the current dues, however gives the option for future increases.

A LETTER FROM THE NEWSLETTER CO-EDITORS

Dear Pacific Section A.A.P.G. Colleagues,

Please use the forms on the following page to renew your membership and vote for new Pacific Section officers. Ballots must be received by June 20, 1993. Your use of these forms will help Pacific Section avoid the high cost of separate mailing. Photo copies are acceptable. Thank you!

JoAnn Conard
Tom Berkman
Newsletter Co-Editors

PACIFIC SECTION A.A.P.G.
DUES STATEMENT - 1993 - 1994

PACIFIC SECTION - A.A.P.G.
Founded 1925
California · Oregon · Washington · Alaska
1993 - 1994

_____
Signature
IS A MEMBER OF THE PACIFIC SECTION
FOR THE PERIOD ENDING JUNE 30, 1994
P. O. Box 1072, Bakersfield, CA 93302

DUES STATEMENT - 1993 - 1994
(This statement is for 12 months - July 1, 1993
through June 30, 1994) (Delinquent after August 31, 1993)

Current Annual Dues	$10.00	_____
Extended Mailing List *	$10.00	_____
(For an **additional** $10,00 you will receive meeting notices for LABGS, SJGS, Coast GS **TOTAL $20.00)**		
PS/Div. Envir Geol. (only) Dues	$10.00	_____

Contributions:
Bob Hacker Memorial Publication Fund _____
Martin Van Couvering Fund _____
Dibblee Map Foundation _____
California Well Sample Repository _____
TOTAL PAYMENT $_____

Please return card with check payable to:
PACIFIC SECTION A.A.P.G.
P. O. BOX 1072
BAKERSFIELD, CA 93302

CHECK if new member (fill out directory data) [ ]
CHECK if no change in directory data [ ]
Please print name _____

Please update DIRECTORY INFORMATION for database

Last Name _____
First, Middle Initial _____
Spouse's Name _____
Highest Degree & Year _____
School _____
Position - Title _____
[ ] Residence Address _____
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_____ (Zip)
Resident Phone ( ) _____
[ ] Employer _____
Address _____
_____
Bus. Phone ( ) _____

Please check ONE of the above boxes above for mailing address.

MEMBER OF:
National AAPG [ ], SEPM [ ], OTHER [ ]

Current directory available from Publications for $5.00

PACIFIC SECTION - A.A.P.G. BALLOT FOR SPRING 1993 ELECTION

Please choose one candidate for each office. (Consult the Winter, 1993 newsletter for more information on each candidate.)

PRESIDENT-ELECT	
[ ] Robert L. Countryman *Chevron USA* *Bakersfield, CA*	*[ ] Herman B. Schymiczek* *EMCON Associates* *Fresno, CA*
VICE-PRESIDENT	
[ ] Muriel R. Norton *Geoquip Corporation* *Ventura, CA*	*[ ] Richard W. Boyd* *Capitol Oil Corporation* *Sacramento, CA*
SECRETARY	
[ ] J. Allen Waggoner *WZI Inc.* *Bakersfield, CA*	*[ ] Donna M. Thompson* *San Joaquin Energy Consultants* *Bakersfield, CA*
TREASURER	
[ ] David C. Salter *Groundwater Technology, Inc.* *Ventura, CA*	*[ ] Donna L. Miller* *Chevron USA Production* *Bakersfield, CA*

GEOLOGIST WANTED

Cenex, a Billings, Montana based oil and gas exploration company, is seeking to employ a full-time exploration geologist with an up-to-date working knowledge of the California Sacramento and San Joaquin Basin's gas play. This individual should have a solid understanding of the geologic structure and stratigraphic framework in the basins, drilling and completion procedures, seismic interpretive and exploitation skills.

Please contact **C. LEE BLATTER, Cenex Exploration Manager** at (406) 656-4343 for an interview appointment and furnish resume and references to Cenex, P. O. Box 21479, Billing, MT 59104.

50 YEARS WITH THE AAPG

The American Association of Petroleum Geologists recently honored members entering their fiftieth year with the AAPG. One of the 79 people who joined the Association in 1943 is **DARREL L. KIRKPATRICK**, a member of the San Joaquin Geological Society. Along with the National AAPG, the Pacific Section Executive Committee and the San Joaquin Geological Society congratulate Mr. Kirkpatrick for his loyalty and longevity.

NEW MEMBERS

Coast Geological Society

LARRY D. GURROLO
UCSB Dept. of Geological Sciences
Santa Barbara

DON R. BRAUN
Coast Range Geologic Consultants
Forestville

San Joaquin Geological Society

WAYNE SCHNEIDER
Bakersfield
PHILLIP J. RAREY
Chevron USA
Bakersfield
MICHAEL D. WRATCHER
Bakersfield
C. THOMAS PINAULT
Chevron USA
Bakersfield
DENNIS M. GIOVANNETTI
ARCO
Bakersfield
JOHN D. TUTTLE
Enterprise Drilling Fluids
Bakersfield
GREGG WILKERSON
BLM
Bakersfield
TOM RIEBEL
Halliburton Logging Service
Bakersfield

(continued from Page 1)

Requirements - add Section 3042

3042. Specialty in Hydrogeology

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

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

1. Be registered as a geologist in the State of California.
2. Have a knowledge of and experience in:

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

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

* * * * * * *

Note that only persons registered as geologists in California may become certified as hydrogeologists, although SB 433 and Section 3042 (d) provide the standard exemption for civil engineers who practice in the area of hydrogeology. Those whose past experience has been largely in petroleum geology will be reassured to note that (E), (F), and (G) of Sec. 342 (b) (2) would allow some of their experience in that field to be applied toward qualification a hydrogeologist. Pacific Section members who are concerned about the proposed new certification and its possible impact on their professional practice may want to discuss this matter with Board member Bob Lindblom or PAC members Jim Weddle or Ken Hersh, who represent petroleum geologists on those bodies.

- Tom Wright

"AAPG DAY"

I attended "AAPG Day" in Tulsa in early February as your representative. This is an annual affair where representatives from all AAPG departments, divisions and sections come together to exchange information and update each other. This seems like a good way to pass along to you some of the highlights.

MEMBERSHIP: Currently 32,976. There are 2,755 members in AAPG who reside in the Pacific states - and only 750 of them are members of the Pacific Section. We sure could use the support of those other 2,000!

CONTINUING EDUCATION: Tuition for selected schools is being reduced via subsidies from major oil companies.

DATA ARCHIVE: A joint project of AAPG, AGI and DOE is investigating the establishment of an archive for geological and geophysical data that is currently being destroyed as many companies downsize.

SYNTHETIC SEISMOGRAMS: An atlas of synthetic seismograms is being proposed. See Paul Hacker for details.

ENVIRONMENTAL GEOSCIENCES: Plans are being made to incorporate environmental geoscience topics into both the Visiting Petroleum Geologist and Distinguished Lecturer program.

RETIREMENT PLAN: The Executive Committee has heard the recommendation of the financial management company to be charged with establishing and running our new program. Details will be forthcoming.

INCORPORATION: The Nevada Petroleum Society has incorporated, and the Austin (Texas) Geological Society is planning to do so in order to avoid liability exposure. Cost appears to be on the order of $350 - in Texas anyway.

DEG: 1,252 members currently. Will be holding first two schools in Midland in March - our own Sue Kiser will be the instructor in one of these. The Division is promoting environmental geoscience curriculum in some colleges.

DPA: 3,855 Certified Petroleum Geologists currently, and 64 more are pending. The primary concerns of the division is state registration of geologists and geophysicists. Fifteen states now have registration laws, and several more are imminent - including Texas, Louisiana and Oklahoma. DPA will handle the certification of coal geologists for the Energy Minerals Division (EMD).

EMD: 2,009 members currently, mostly on the Gulf Coast.

ALTERNATIVE EMPLOYMENT: The Executive Committee will consider establishing a program through the local societies. If approved, a test program will be run in one or two societies. I suspect this may be along the lines of the seminar this Section held in 1987.

- Jack H. West

DREAMS

Late day upon the shores of a magic sea
aluminum waves held, then crashed
Terns swept above the sea, northerly
pelicans flew by in military order, then
Settled with churchillian Vs of wings

Erasing incoming tide left lacy edging
offshore wind brushing memories away
And whispered new ones in my ears
dashing colored clouds, juggernauts of mist
Warred above, then the sky blew clear
and closed again, like the eye of God

A child of spindrift and flotsam was cast
again shivered through her cloth of pain
Upon darkening shores of sand and dreamed
golden galleon sails and Indian smoke
Horses pounding, jumping by fires glow
the waves broke once and twice and then
broke again

As sun slowly failed, sky and sea gleamed
like Russian icons, seals hoarsely chanted
And wept fresh water tears of regret
I dream of flying free to cry and hear
as warm arms of sifted sand enclose me
With feldspar, subrounded quartz
and various minerals accessory
Biotite, ilmenite and
other minor opaques

Pat Bell, 1993

BLM MEDIA RELEASE

Environmental Analysis of Oil & Gas Lease Sale Ready for Review

The BLM has identified 57 parcels of land totalling 48,000 acres in Kern, Fresno, San Benito, Monterey and San Luis Obispo Counties that have potential for oil and gas development. An environmental analysis (EA) of the impacts of exploitation and drilling has been prepared and is available for public review and comment.

BLM plans to offer these parcels for lease later this year. They were selected by BLM staff during environmental screening of potential lease sites. They are located in or near Midway Sunset, Maricopa, Wheeler Ridge, Lost Hills, Round Mountain and Kern Bluff in Kern County, the North Coalinga field in Fresno County, the Griswold Hills in San Benito County, near Camp Roberts in Monterey County, and the Caliente and Temblor Mountain areas of San Luis Obispo County.

The lease sale will be held in Bakersfield in June and leases will be awarded to the highest bidder. Congress requires BLM to regularly offer oil and gas lease sales to the public.

FIELD SUMMARIES/GEOLOGICAL ARTICLES WANTED

The most informative and popular part of recent P.P.G. Newsletters has been the "Field Summary" sections which have become a regular feature of this publication. In the past the California DOG did a wonderful job in furnishing geological information on oil & gas fields, but their publication of this vital data has decreased in scope during recent years. This has made the summaries published in our newsletter all the more important and put the burden of distributing the data on ourselves. Several of you have told me how useful you find the field summaries and how you regularly file them for future use. It was also good to see that several of the summaries were cited by authors in the most recent Pacific Section AAPG publication, "The Structural Geology of the Sacramento Basin" (MP-41). Our newsletter has also featured various other short articles on or related to West Coat exploration geology such as the article in this issue. These also have been well received.

There has been good response in soliciting articles from the membership these past three years without too much armtwisting and I'd like to thank all of you who have contributed articles to the newsletter. We are, however, in the need of additional field summaries and/or related geological articles. Field summaries on several of the recent discoveries in California and Alaska would be of the greatest interest to the membership, but articles on some of the older fields on which little has been published would also be appreciated, especially if there is something interesting or unique about the accumulation. Several of the offshore fields might fall in this latter category.

Speaking from personal experience, an article can be written in your spare time in a week or two. However, I would like to point out that several of you have previously presented oral papers on some of these fields or have already written proprietary reports which could be modified and submitted to our newsletter without too much effort, as much of the work has been done. Your contribution would benefit yourself and the membership and would be greatly appreciated.

Papers need not be limited to field summaries. We have a large membership with varied geological interests and who are employed in a variety of disciplines. I am sure there are some of you that would like to share your ideas. It has also been suggested that a "discussion and reply" article similar to that found in the AAPG Bulletin might be of some interest to the membership. I'm sure not everyone agrees with everything published in some of the latest Pacific Section publications. The newsletter might present a forum to present alternative interpretations or additional data.

In closing, I'll put in a plug for the other Pacific Section affiliated societies. Both the SEPM and the SEG have newsletters and if this editorial motivates you to write an article which would be best served in their newsletters, feel free to submit it to them. I'm quite sure the other editors would be very receptive to your contribution.

Frank Cressy, Geological Editor

Below is a letter written by the AAPG President Harrison L. Townes to President Clinton concerning the energy industries. The letter was read by Mr. Townes at the opening session of the Pacific Section AAPG convention in Long Beach. Although the session was scarcely attended, the letter contains information and ideas that effect all of us within our industry and the nation at large. For those reasons I asked Mr. Townes for permission to publish it in our newsletter.

John W. Howe, Secretary, Pacific Section AAPG

May 10, 1993

The President of the United States
The White House
Washington, DC 20500

Dear Mr. President:

As you begin your term of office, I would like to make four observations regarding energy policy. I am an independent geologist and oil producer who has a stake in our future, who believes in protecting the environment, and who believes in our free enterprise system.

My first observation is in regard to your policy that CO_2 emissions from burning of fossil fuels will be reduced to 1990 levels by the turn of the century. I understand that Energy Secretary O'Leary and Treasury Secretary Bentsen have counseled that such a policy is not desirable. I agree with their conclusions for two reasons. First, it is estimated that the population of the United States will grow by approximately 21 million people during the rest of this century. Even if energy consumption per capita could be stabilized, population growth would require the additional use of fossil fuels, which are the only sources of energy available in the quantities needed to serve the growing population and also to fuel the economic recovery which you are attempting to achieve. There simply are not alternatives that would be in place between now and the year 2000 that could even begin to replace the five billion barrels of oil and 20 trillion cubic feet of natural gas that the United States consumes each year.

The $327 million proposed in your 1994 Department of Energy budget for solar and renewable energy can only be described as a symbolic gesture. The public would be better served if this money were devoted to more efficient use of our existing fossil fuels.

My second observation is that you have a duty to the American public to make it clear that your proposed BTU energy tax is designed to cut consumption. It wold be most unfortunate if the public was led to believe that it was the utilities and other distributors of energy that were the cause of rising prices to consumers. If you support this tax, you should take responsibility for it.

My third observation is in regard to our domestic oil and gas industry. From my experience as Governor of a producing state, and from your public comments, you appear to have an informed view of where our industry stands at the present time. Your predecessor, while calling himself an oil man, did little to help us until 1992. Over 400,000 jobs were eliminated in the last decade, and government regulators became increasingly hostile to our business. An adversarial relationship now exists, which you have inherited.

Independents, who operate most of the very necessary stripper wells, do most of the new drilling and exploration and will do most of it in the future, are being forced out of business due to increasing governmental restraints. Mr. President, most domestic oil and gas operators are small business persons; your positive attitude toward small business must extend to independent oil producers, too.

The economic cost of increasing reliance on imported oil, and the economic cost of escalating regulatory compliance to domestic procedures add up to a negative effect on our economy, which is not robust.

My final observation has to do with our domestic oil and natural gas resource base. There is an attitude in many places that there is not enough oil or gas left in the U.S. to justify the capital investment required to find it. Mr. President, this is a myth that has been renewed periodically ever since the British Navy converted from coal to oil early in this century - the myth that we are running out of oil. A U.S. Bureau of Mines report produced in 1920 sounded the alarm that we were running out of oil. That forecast was obviously flawed. The same alarm is being sounded today by individuals even less knowledgeable than the authors of the 1920 report.

A recent study by the DOE, in which many AAPG members took part, estimated that there are 100 billion barrels of oil yet unproduced in the U.S. at $20 per barrel using existing technology. With advanced technology, this figure would rise to 142 billion barrels. For perspective, the oil reserves of Kuwait are 100 billion barrels, which were very costly for us to preserve and restore to the world's available supply. We should remember this when setting our national priorities.

Unfortunately, much of our undiscovered oil and gas reserves lie under public lands and in areas where drilling moratoria have been established. As you are aware, 30 percent of the total U.S. is public land, and in promising areas such as the offshore and Alaska, the proportion is much higher. And speaking of Alaska, your repeating of the comments that there is probably not enough oil underlying the Coastal Plain of ANWR to justify the environmental impact of developing it is merely playing to a one-issue audience. There is much evidence both environmentally and economically that the benefits of exploration and production in this tiny part of ANWR overwhelm the risks involved. Additionally, the government is not being asked to provide risk capital to find out.

One of the reasons for the exodus of large oil companies and their capital from the domestic scene are the drilling moratoria on these promising areas; if you don't believe me, ask them.

Mr. President, let us work together and develop an energy policy that is real and attainable.

Sincerely,
Harrison L. Townes, President

RECOMMENDED READING

A.A.P.G. BULLETIN
Vol. 77/3 March 1993

Multiple Phases of Tertiary Uplift and Erosion in the Arctic National Wildlife Refuge, Alaska, Revealed by Apatite Fission Tract Analysis, P. 359, by P.B. O'Sullivan et al.

U.S. Geological Survey Petroleum Resource Assessment Procedures, P. 452, by C.D. Masters et al.

U.S. Geological Survey Estimation Procedure for Accumulation Size Distribution by Play, P. 454, C.D. Masters et al.

Future Growth of Known Oil and Gas Assessment, P. 479, D.H. Root et al.

Small Fields in the National Oil and Gas Assessment, P. 485, D.H. Root et al.

Economics and the National Oil and Gas Assessment: The Case of Onshore Northern Alaska, P. 491, E.D. Attanasi et al.

BOOKS

Applied Groundwater Modeling: Simulation of Flow and Advective Transport, by Anderson/Woessner (1991). Harcourt Brace Jovanovich, Price $69.95.

Contaminant Hydrology, by C. W. Fetter (1993). Macmillan Publishing Co. Price $60.

Deep Marine Environments: Clastic Sedimentation and Tectonics, K.T. Pickering et al (1989). Unwin Hyman, 8 Winchester Place, MA 01890; Paper L80.

Giant Oil and Gas Fields of the Decade 1978-1988, edited by M.T. Halbouty, 1992; AAPG Memoir 54, hardbound; $139.

GEOLOGICAL SOCIETY OF AMERICA
Vol. 105, No. 1, January 1993

Eustasy Versus Subsidence: Lower Paleocene Depositional Sequences From Southern Alabama, Eastern Gulf Coastal Plain (Page 3), by E.A. Mancini and B.H. Tew.

Vol. 105, No. 3, March 1993

The Cenozoic Structural Evolution of a Fold-and-Thrust Belt, Northeastern Brooks Range, Alaska (Page 287), by C.L. Hanks.

JOURNAL OF SEDIMENTARY PETROLOGY
Vol. 63, No. 2, March 1993

Origin of Zeolite Cements in the Miocene Sandstones, Northern Tejon Oil Fields, California, P. 248, J.H. Noh et al.

THE NEW YORKER
September 7, 14, 21, 1992

Annals of the Former World (Geology - Parts 1,2,3), J. McPhee.

U.S.G.S. Open File Reports

OF 90-707. Concepts and Modeling in Ground Water Hydrology: a Self-paced Training Course, by O.L. Franke et al. 1991 443 pages, microfiche $4; paper copy $66.50.

OF 91-0625 Core Description. Grain Size, and Carbon Analysis Data of Cores Collected on Cruises F5-87-SC, F1-88-SC and F3-89-SC from the Monterey Fan, off Central California, by L.R. Badger et al. 1991, 259 pages, microfiche 4$; paper copy $39.

OF 91-0484 A Computer Program (MODFLOWP) for Estimating Parameters of a Transient, Three-Dimensional, Ground-water flow model using nonlinear regression, by M.C. Hill. 1992, 358 pages, microfiche $4; paper copy $55.

OF 91-0494 A Generalized Finite-difference Formulation for the U.S.G.S. Modular Three-Dimensional Finite-Difference Ground-water Flow Model, by A.W. Harbaugh, 1992, 60 pages, Microfiche $4; paper copy $24.50.

DEADLINE FOR SUMMER ISSUE AUGUST 15, 1993

NEWSLETTER of the Pacific Section - American Association of Petroleum Geologists Newsletter is published quarterly by the Pacific Section. Material for publication, requests for previous copies, and communications abut advertising costs should be addressed to THOMAS A. BERKMAN, ARCO Oil & Ga Co, P. O. Box 147, Bakersfield, California 93302. CHANGE OF ADDRESS, subscription, and membership inquiries should be directed to: MEMBERSHIP SECRETARY, PACIFIC SECTION AAPG, P. O. BOX 1072, BAKERSFIELD, CA 93302. PUBLICATIONS COMM.: Pacific Section -

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PACIFIC PETROLEUM GEOLOGIST NEWSLETTER

of the Pacific Section
American Association of Petroleum Geologists

SUMMER 1993 No. 3

PRESIDENT'S COLUMN

Thanks go to many individuals for a successful year for the Society. In particular, **Paul Hacker**, outgoing president, provided inspirational leadership during these trying times. **Bob Countryman, John Howe, Muriel Norton** and **John Randall** kept the Society afloat and moving forward with their insightful recommendations and hard work. **Jack West, Tom Berkman, Dan Olson** and **Betty Bean** and other committee chairpersons provided the expected consistent and excellent effort throughout the year, and it is hoped they will be able to continue in 1994.

The degree of success for the Society depends, of course, on the annual convention. This year's Long Beach convention was very profitable for the Society. **Don Clarke**, general chairman, is to be congratulated for a successful meeting, despite numerous obstacles and challenges.

The annual convention in particular, but also local monthly and weekly meetings would not be successful were it not for your participation. The continued changes in the oil and environmental industries necessitate that all of us like-minded individuals associate for support and survival. Associating with others in the same business is a key ingredient to a successful career.

We need to recognize the importance of attending conventions and meetings. We never know what one thing might be said at a talk or over coffee with someone that might be a key to solving a problem. Can we afford not to attend? I believe it to be short-sighted to not go just because there is no talk in one's particular geologic domain. Corporations and management, as well, are short-sighted by not promoting these meetings. I've never come away from a meeting wishing I had not been there. If the company doesn't support you, make the investment yourself-go on your own, and plan on really getting something out of it. Plan On It!!

I hope my activities as President of the Society will allow me to meet many more of you as I travel the local meeting circuit. I hope to see all of you in Ventura next year where we can encourage each other and perhaps develop the attitude that once again will make us excited about the future.

- Reinhard J. Suchsland
President
Fall, 1993

CALL FOR PAPERS

1994 PACIFIC SECTION MEETING
AAPG - SEPM - SEG - SPWLA - AEG - SCA

The 1994 Annual Meeting of the Pacific Section American Association of Petroleum Geologists (AAPG), Society of Sedimentary Geology (SEPM), Society of Exploration Geophysicists (SEG), Association of Engineering Geologists (AEG), Society of Petroleum Well Log Analysts (SPWLA), Society of Core Analysts (SCA), and AAPG Division of Environmental Geosciences, Energy Minerals, and Professional Affairs, will be in Ventura, California April 27-29, 1994. The site of the convention will be the Doubletree Hotel.

The theme of this year's convention, "Rediscover California: From Outcrops to Oil", is a reminder that our understanding of California's geology is far from complete and that the diverse groups participating in this convention have a multitude of perspectives to offer. A major focus of the program is the geology of the Western Transverse Ranges and associated basins both as a symposium and field trip.

Located less than an hour up the coast from Los Angeles and 30 minutes south of Santa Barbara, Ventura has miles of clean uncrowded beaches, beautiful mountains and backcountry, and the rugged and unspoiled Channel Islands National Park on the horizon. The Doubletree Hotel is right at the beach, adjacent to San Buenaventura State Beach Park, and the nearby Ventura Harbor offers a picturesque seaside "village" of shops, restaurants and the Channel Islands Park headquarters. Trips and charters to the islands are available year-round or enjoy a Champagne

(Continued on page 3)

PACIFIC SECTION IN LEAN TIMES

Do you wonder what is done with your annual $10 membership? It provides the basis of the general operating fund for the Pacific Section of the AAPG, SEG and SEPM. The most visible use of these funds is in your hand, the Pacific Petroleum Geologist Newsletter. The direct costs associated with the newsletter, now published four times a year, are the printing, word processing and postage. All the articles and regular features are assembled and edited by a dedicated team of volunteers. You most likely have noticed that it is now printed on different paper and recently with different colored ink. This is in response to requests to reduce costs of operation due to the decline in membership income.

The Executive Committee of the Pacific Section of the AAPG, SEG, SEPM and other associations has been faced with the same problems familiar to each of us in the industry. Namely, declining west coast representation of people associated with the geoscience field from which this organization began. This decline in personnel is reflected in the membership statistics for the seven Pacific Section societies from Alaska to southern California. From 1,030 active members at the end of 1990, to 906 at the end of 1991, to 837 at the end of 1992, the membership numbers go down.

When the Executive Committee was asked to come up with ways to save or generate money, they responded positively. Costs have been dramatically cut in the production of the newsletter by changing paper quality, the printer, the word processing and the frequency of publishing. Income has been generated through advertising in the newsletter, by contribution for membership directory printing costs and by holding the Cal OSHA course in Bakersfield this spring.

Income for the Pacific Section comes from six main sources; annual membership dues, the annual Pacific Section convention, interest from bank accounts, contributions towards specific funds by members, advertising and occasional donations. Undeclared income, in the form of the dedicated volunteers, is not measurable on a balance sheet but is reflected in the able stewardship of the Executive Committee. They monitor, and frequently agonize over, the expenditure of this income. This newsletter is the forum for information to be shared by all members and is here for your participation and comments. Besides the newsletter, money that comes in supports deserving students in our industry in the form of sponsorship to the annual convention and to field trips. It also supports each of the seven associated Societies based on their memberships; and, last but not least, it supports the various special funds that disseminate information to all of us, including the **Dibblee Map Fund**, the **Well Sample Repository** and the **Hacker Publication Fund**.

The complicated equation of WHY there are fewer members (the downsizing/reorganization/reduction/relocation of staff or whatever word you find least offensive) also reflects the general economic condition of the country. No big news here. In the case of the Martin Van Couvering Student Awards,which come directly from membership contributions and bank account interest, the number of students that may be sponsored has been reduced. For example, interest rates on the bank account that the Pacific Section has for the Van Couvering awards has gone from 6.8% in June 1990 to 3.3% in June of 1993, which translates from about $1,300 as an annual interest income in 1990-91 to about $425 in 1992-93. Other bank account interest has gone from 5.0% to 1.25% in the same period. The Van Couvering account interest money permitted the award of free registration at the 1991 Convention to ten students, in 1993 we could sponsor only five students. Each year the amount available to support field trips has also been reduced.

There are now four funds to which you are able to contribute additional money. These are the Thomas Dibblee Jr. Geological Map Fund/Foundation, the Martin Van Couvering Student Support Fund, the California Well Sample Repository Fund and the Robert N. Hacker Publication Fund. Each year the amount accumulated through your specific donations is transmitted to the operators of these funds as support from the general membership. It recently helped get another of Tom Dibblee's maps printed. You have invested in our future with support of students' attendance at the annual convention or on a field trip. The well sample repository continues to be available to anyone, for historic data searches; and we will be able to print another field trip guidebook with donations to the publication fund.

We depend on our annual convention to generate operating income. This has been hit-and-miss over the last few years. We continue to seek the difficult balance between probable attendance projection and location of the convention. We would all like to visit the "resort" locals, but we don't have resort money, nor are our companies as free in these gloomy days in allowing us to attend these meetings unless they are in our own back yard, and then on a limited basis.

Your continued support of the Pacific Section is needed. If you feel like contributing to whichever area interests you, please do. Encourage others to join. We are all depending on you.

- Muriel R. Norton

BLM WANTS NOMINATIONS FOR OIL LEASE SALES

The Bureau of Land Management is seeking nominations for future oil lease sales in California. Leases allow for oil exploration on federal land, and BLM wants to know in which areas the oil industry is interested.

The next lease sale will focus on areas covered by the new Resource Management Plan (RMP) for BLM's Hollister Resource Area. That includes all federal land within the counties of Monterey, San Benito, Fresno, Madera and Merced. If a nominated parcel in this area is identified in the RMP as being available, then it will be offered for lease.

Industry participation through the nomination process is crucial to the success of the leasing program. In order to process parcels in a timely manner, nominations should be received September 30th. Nominations must be submitted in writing to:

Fred O'Ferrall
Chief - Leasable Minerals Section
Bureau of Land Management
2800 Cottage Way, Rm. E-2845
Sacramento, CA 95825

The lease sale for the Hollister area parcels will be the first in many years to rely on an Area-wide Resource Management Plan as opposed to a site specific Environmental Analysis (EA). For questions about the leasing program or the nomination process, call **Jeff Prude** at (805) 861-4186.

ELECTION RESULTS 1993 - 1994
CONGRATULATIONS TO NEW OFFICERS!

PACIFIC SECTION AAPG

President - Reinhard J. Suchsland
CENEX
President Elect - Robert Countryman
CHEVRON USA
Vice President - Rich Boyd
CAPITOL OIL INC.
Secretary - Donna M. Thompson
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SEPM

Jim Ingle - President
John Cooper - President-Elect
Isabel Montanez - Vice-President
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NW OIL REPORT
Dan Wermiel - Treasurer
DOG AMI

SAN JOAQUIN

October 12th - **Michael S. Clark** of ARCO will present a co-authored study with **Paul G. Lissis**, USGS and **Glenn Gregory** of Santa Fe Energy Resources: "The Sespe Oil Fields - A Possible Kinetic Accumulation with a subthrust Source.

SJGS meetings are held at the American Legion Hall, 2020 "H" Street in Bakersfield. Attitude adjustment starts at 6:00 p.m. and dinner is served at 7:00 p.m. For more info or reservations contact **Mike Dumont** at 321-4265.

COMING EVENTS

PACIFIC SECTION SEPM FALL FIELD TRIP

Cretaceous Great Valley Group Cache Creek Area, October 9th and 10th. For more information, contact **Isabel Montanez** at (909) 787-3441.

COMMUNITY ENERGY NIGHT
October 6, 1993
Bakersfield Convention Center
Social Hour: 5:30-6:30 p.m.
Dinner: 6:30 p.m.
Program: 7:30-9:00 p.m.

Speakers: **DENISE BODIE, President of Independent Producers Assoc. of America**
and
RICHARD J. STEGEMEIER, Chairman and CEO of Unocal Corp.

Each of the speakers will be talking about the importance of the energy industry in Kern county and our nation. For more information contact **Marlene Meyers** at (805) 633-3257.

Call for Papers *(Continued from page 1)*

Harbor Cruise. Historic downtown Ventura is filled with antique shops, unique thrift stores, several museums and includes Mission San Buenaventura, founded in 1782.

We invite authors to submit original work for either oral or poster sessions. We will review abstracts and select those having the greatest geological significance, general interest appeal and best relation to our theme. Contact **Bill Bilodeau**, Technical Program Chairperson, for abstract forms at (805) 493-3264.

- Dalton Lockman

Pliocene Gas Potential on the Bakersfield Arch, California

by: Janice M. Gillespie

On July 26, 1919, the Hay No. 7 well at Elk Hills blew out at an estimated rate of 50 MMCFD. It took over 10 days to stop the uncontrolled flow of gas from the well. When placed on production, the Hay No. 7 produced 43 BCF of gas and was "hailed as the world's most productive gas well" (Rintoul, 1990). The gas reservoir was Pliocene sandstone.

Many other wells at Elk Hills and on the western Bakersfield Arch have produced gas from Pliocene sandstones since 1919. Although these wells are inexpensive to drill and produce, the Pliocene is not a common exploration target because 1) the reservoirs are small, and; 2) their distribution is somewhat unpredictable. This report documents some initial results of a larger Bakersfield Arch Pliocene study currently in progress at CSU Bakersfield which addresses these problems.

Pliocene strata in the southern San Joaquin Basin record the shallowing, and eventual disappearance, ofa deeper Miocene seaway. Relatively deep-water cherts and turbidites of the Miocene Monterey Formation are succeeded by shallow and marginal marine deposits of the predominantly Pliocene Etchegoin and San Joaquin Formations. The overlying Tulare Formation (Pleistocene) consists of nonmarine fluvial/lacustrine sediments which record the final phase of basin filling.

Table 1 shows the cumulative Pliocene gas production from fields on the Bakersfield Arch as well as average cumulative production on a per well basis. Cumulative per well production in the more easterly fields (i.e. Ten-Section) is approximately 0.5 BCF or less and is evenly distributed between the Etchegoin and San Joaquin Formations. In the westernmost fields on the Arch (i.e. Coles Levee), the cumulative production per well increases to over 5 BCF per well. Although gas reservoirs are found throughout the Pliocene section at Coles Levee, the bulk of the gas comes from the lower Etchegoin-mainly the lower Gusher and Calitroleum zones.

What factors account for these differences in production? Since many Pliocene gas accumulations are found in stratigraphic traps, depositional processes are important because they control the thickness and lateral extent of the reservoirs.

The entire Pliocene section thickens from east to west across the Arch. Although quantitative work on sand:shale ratios is still incomplete, the percentage of shale in the Pliocene interval, as well as the thickness of shale interbeds, appears to increase to the west. The thickest and most laterally extensive sandstones are usually found in the lower Etchegoin Formation in the western part of the Arch.

In addition, the influence of marine processes on Pliocene deposition appears to decrease both up-section and laterally in an eastward direction. Isopach maps of the productive lower Gusher sandstones at Coles Levee indicate that they are elongate in a northwesterly direction parallel to the basin margins. This orientation, as well as the presence of shallow marine fossils, suggest that the Gusher sands were deposited along a paleoshoreline, perhaps along the fringe of a delta formed by a ancestral Kern River.

The thickest sand accumulation in the Calitroleum zone seem to be located along the present-day crest of the South and North Coles Levee structures. If these features intersected wave base during Pliocene time, wave action may have concentrated sands over the anticline crests as shallow marine offshore bar deposits. However, the complex thickness isopachs of the Calitroleum sandstones indicate that other processes, perhaps longshore currents, were also important controls on sand distribution.

Sandstones in the upper part of the Pliocene at Coles Levee, as well as most Pliocene sandstones farther east of the Arch, are generally thinner and less laterally extensive. They also exhibit less evidence of marine influences and deposition. These thin sandstones may represent crevasse splays and tidal and distributary channel deposits in the move alluvial environs along the paleoshoreline. While the amount of gas in these sandstones is small, the reservoirs are often found vertically stacked within a well. Operators usually perforate the lowest sand in this sequence and, when this reservoir is depleted, proceed uphole until all the gas reservoirs are exhausted.

Faulting is also an important trapping mechanism. Structure cross sections and seismic lines indicate the presence of numerous listric normal faults within the Pliocene section. Although displacement is small (about 100 feet maximum), these faults are similar in appearance to the larger growth faults observed in deposits of the present-day Mississippi Delta.

Two types of structural traps are associated with these faults:

(Continued on page 5)

(Continued from page 4)

1. Structural closure created by small rollover anticlines in the hanging walls of the faults. These prospects often contain several thin, vertically-stacked producing horizons.

2. Juxtaposition of impermeable shales updip from reservoir rocks across the fault. This type of trap is best developed on the western most Arch where shale beds are thicker and more abundant.

Although the study is far from complete, these initial results suggest that reservoir size and the probability of encountering structural traps are greater farther west on the Arch. We hope that further study will enable us to build a clearer picture of Pliocene paleogeography and delineate other prospective areas of Pliocene exploration.

Table I

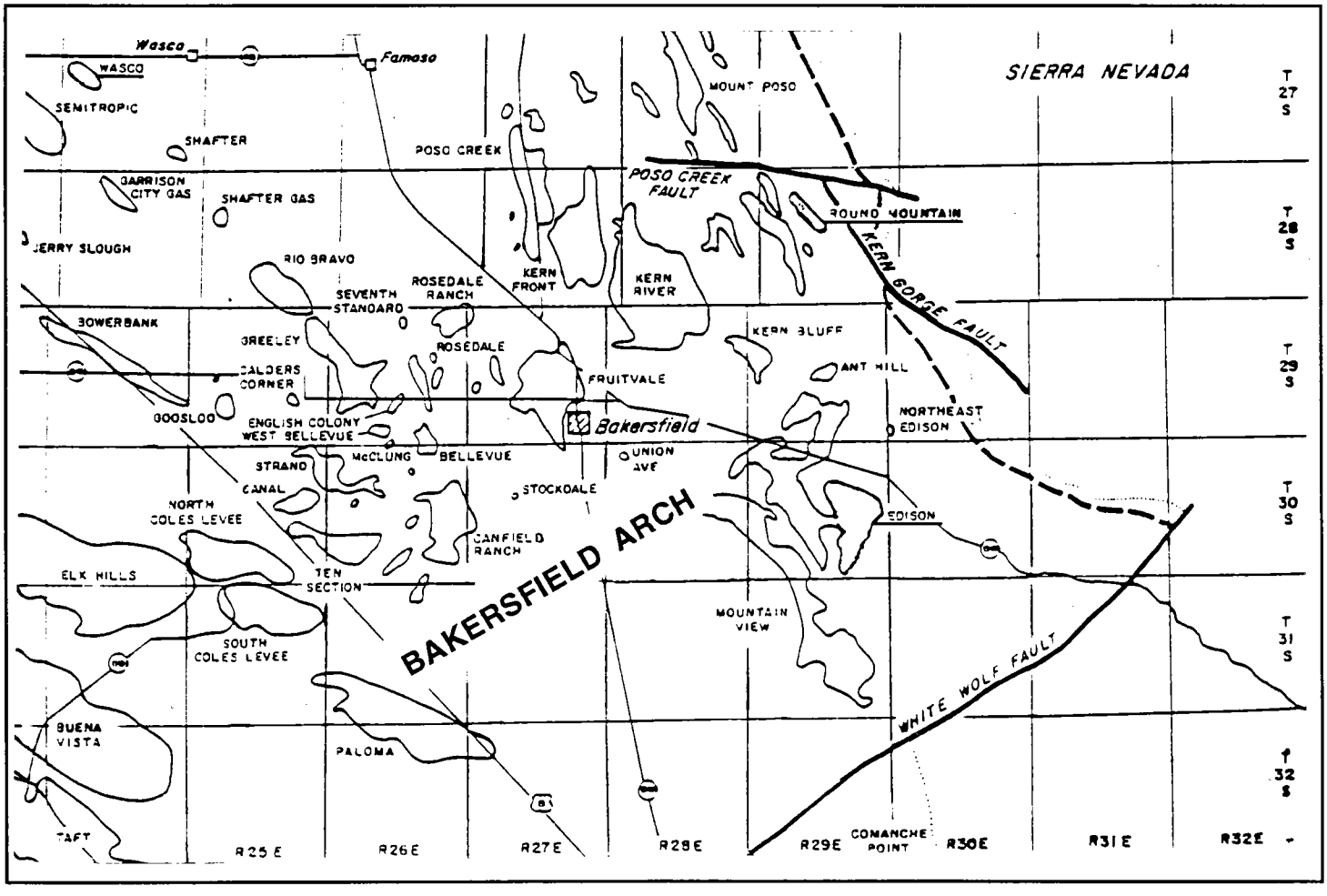
PLIOCENE GAS PRODUCTION BY FIELD

FIELD	FIELD CUM. PROD. *(BCF)	CUM. PROD. (BCF)/WELL*
Strand	0.1	0.04
Canal	1.3	0.43
Ten Section	7.1	0.5
North Coles Levee	11.1	2.8
South Coles Levee	35.9	5.9
Paloma	4.5	1.4

* As of 1974 production figures

REFERENCES

Rintoul, W., 1990, Drilling through time: 75 years with California's Division of Oil and Gas; California Department of Conservation, Sacramento, P. 178.



DELEGATES' CORNER

Annual Meeting of the House of Delegates

The annual meeting of the AAPG House of Delegates was held in New Orleans on April 25, 1993. The status of the Association was reviewed by the officers and executives of AAPG. The House also acted on proposals to broaden the base of AAPG and improve representation.

In the President-Elect's report, **Don Tobin** indicated the Association is healthy, but not necessarily growing. The Association is operating in the black, with an income of about $9,000,000 last year. Eight percent of AAPG is in the Pacific Section; seven percent is in California. Dues provide only 19 percent of the Association's income, with conventions (29 percent) and advertisements (10 percent) also important.

AAPG's Treasurer, **Susan Landon**, reported that the reserve fund is growing and is now at $4,500,000. The reserve is necessary to prevent financial disaster in case of a convention "dry hole" (as AAPG considers the last Los Angeles National Convention; don't expect AAPG ever to return to LA).

Susan Longacre reported on the activities of the Editor. Geobyte has been suspended but not abandoned. Elements of Geobyte may be farmed out to the Explorer and other media. The Bulletin published 96 papers in 1992, focusing mostly on reservoir characterization, stratigraphy and structure. Papers on hydrogeology are also appearing.

Officers of the three AAPG Divisions presented their reports. Of special note, the Division of Professional Affairs now supports state registration efforts. The new Division of Environmental Geosciences has an excellent start, with 1800 charter members (as of April).

Executive Director **Fred Dix** reported that the AAPG is considering a retirement plan, with a 401(k), for members. One item of interest to many members: annual meeting abstracts are available only as a special publication. As a service to the sections, local meeting abstracts will continue to be published in the Bulletin.

In Delegates' new business, the House voted to forward to the membership a proposal to expand the purpose of AAPG to include other technical specialties and disciplines. The Constitutional change would embrace into the Association members working in the environmental or ground water areas.

The House rejected a proposal to require the Advisory Council to submit two candidates for the office of Editor. At least one local society objected to having only one selection during elections. However, in rejecting the proposal, the House recognized the problems in obtaining even one candidate willing to make the time and resource commitment. A committee will be established to investigate changing the Editor's office to an appointed position.

The House voted for a bylaw change that would permit At-Large Delegates to represent members from areas outside the US that are not currently assigned to an Affiliated Society. At lease 20 active members of a group would be required for the first At-Large Delegate.

- S. A. Reid
SJGS Delegate

STATE REGISTRATION EXAM NOW GIVEN TWICE A YEAR

The Summer 1993 newsletter published by the California State Board of Registration for Geologists and Geophysicists contains a lot of useful information about the Board and how it functions. Some of the highlights follow:

- The Board plans to resume administering the qualifying examinations twice each year beginning in 1994. Exam dates will be announced in the spring and fall.
- Higher fees are forthcoming - $100 when making application and $200 license renewal every two years.
- The Enforcement Unit of the Board will be instituting an increased enforcement effort, primarily in the health and safety fields. A backlog of 116 unresolved complaints has buildup, and the rate of incoming new complaints is also on the rise.

(Continued on page 7)

A LETTER FROM THE CO-EDITORS

We would like to announce several recent newsletter staff changes. Welcome to **Nancy Parrott**, who is now doing our word-processing and layout. Special thanks to **Reneé Carr**, who served in that role for more than two years. Welcome to **John Howe**, who will soon be taking charge of newsletter advertising.

In the next newsletter, we would like to print comments from geologists who have made the switch from petroleum to the environmental industry. Please send your comments - positive or negative - to Tom at his ARCO address (see back cover). Thank you!!

Tom Berkman
JoAnn Conard
Newsletter Co-Editors

NEW MEMBERS

L A BASIN GEOLOGICAL SOCIETY

Laurence R. Greene
Los Angeles
Jack F. Conley
Whittier
Peter W. Weingand
Northridge
Richard C. Slade
North Hollywood
T. Michael Pendergrass
Alta Loma

COAST GEOLOGICAL SOCIETY

Christopher C. Sorlien
Goleta
Thomas D. Runyon
Ventura
Eric C. Abbott
Camarillo
David J. Panaro
Moorpark
Linda M. Jason
Ventura
Jayme L. Laber
Ventura
Richard C. Harp
Ventura
Peter D. Dal Pozzo
Ventura
W. Spencer Mitchell
Ojai
Marc J. Kamerling
Santa Barbara
Greg K. Middleton
Santa Paula
David Gardner
Thousand Oaks

SACRAMENTO GEOLOGICAL SOCIETY

Walter J. Koop
Walnut Creek

SAN JOAQUIN GEOLOGICAL SOCIETY

Gena Evola
Bakersfield
Thomas A. Mele
Tupman
Jeff D. Milton
Bakersfield
Gary E. Philbrick
Coalinga
Jeffrey J. Sande
Bakersfield
Richard S. Thesken
Bakersfield
David R. Clark
Bakersfield
Eileen A. McMullin
Bakersfield
Joe Nahama
Bakersfield
George Stewart
Bakersfield
Mark G. Lehrer
Denver, CO
Charles A. Schile
Bakersfield
Reginald Van Driest II
Colorado Springs, CO
Conrad B. Howard
Bakersfield
Kenneth H. Turner
Bakersfield
J. Fred Bir
Bakersfield
Chuck A. Dobie
Bakersfield
Zorka A. Foster
Bakersfield
Jeffrey A. Tassone
Tulsa, OK
Mitchell F. Morea
Bakersfield
Charles D. Wolf
Lubbock, TX
Douglas B. Blatchford
Bakersfield

WARNING!! ANYONE CHANGING JOBS OR RETIRING: Are you aware of the deadly tax traps the IRS and the tax hungry Congress has set that could cost you a fortune? A **FREE REPORT** called, "How to Avoid Letting The IRS Grab Your Retirement Distribution!" is available by calling 800-339-9897, 24 hrs., for a **FREE** recorded message to find out about the ugly tax traps the IRS doesn't want you to know about.

State Exam *(Continued from page 6)*

- Legislation that will create a hydrogeologist specialty (SB 433) is being carried by Senator Craven. Hydrogeologists are the single largest group of practicing geologists in the nation now. How times do change!
- The California Board of Registration has joined the nationwide Association of State Boards of Geology.
- The Summer Newsletter contains a good outline of the Board's responsibilities and functions, including procedures for processing complaints. All registered geologists and geophysicists should have received a copy, or you may be able to obtain one from the State Board, (916) 445-1920.
- Reciprocity with other states is subject to change. Applicants intereted in reciprocity should contact the State Board for current information prior to applying.
- The Summer Newsletter also contains a good summary of data reporting recommendations for hazardous waste site ivestigations. Contact a registered geologist or geophysicist, or call the Board for a copy.

- Jack H. West

CENOZOIC PALEOGEOGRAPHY OF THE WESTERN UNITED STATES
A Symposium and Volume

CALL FOR PAPERS

The Paleozoic and Mesozoic symposia and volumes are complete and on the market. Hopefully, you have gotten or will get yours from the Pacific Section, SEPM. Now it's time to begin plans for the Cenozoic symposium and volume.

If you are a potential contributor, write by October 15, 1993, to **Eugene Fritsche**, Dept. of Geological Sciences, California State University Northridge, CA 91330 with your tentative title and the estimated number of published pages required for your paper. Additional details will be available at that time. Questions? Call Fritsche at 818-885-3541.

RECOMMENDED READING

A.A.P.G. BULLETIN Vol. 77/4 April 1993

Calculation of Vitrinite Reflection from Thermal Histories: A Comparison of Some Methods, D.W. Morrow, et al, P. 610.

Vol. 77/5 May 1993

Presidential Address. The Hydrocarbon Era, World Population Growth and Oil Use--A Continuing Geological Challenge, H.L. Townes, P. 723.

Geohorizons. Siliciclastic Sequence Stratigraphy and Petroleum Geology--Where to From Here? H.W. Posamentier et al, P. 731. Natural Gas Hydrates of the Prudhoe Bay and Kuparuk River Area, North Slope, Alaska, T.S. Collett, P. 793.

Vol. 77/6 June 1993

Relation Between Extensional Geometry of the Northern Grant Range and Oil Occurrences in Railroad Valley, East-Central Nevada. K. Lund, et al, P. 945.

AEG NEWS Vol. 36, No. 2, 1993

Issues in Professional Registration X: What is "The Public Practice of Geology." Tepel, R.E., P. 43-44.

GEOLOGICAL SOCIETY OF AMERICA BULLETIN
Vol. 105 No. 4 1993

Latest Cretaceous Basin Formation within the Salinian Terrane of West-Central California, K. Grove, P. 447.

Style and Magnitude of Tectonic Shortening Normal to the San Andreas Fault Across Pyramid Hills and Kettleman Hills South Dome, CA., R.B. Block et al, P. 464

GEOLOGY Vol. 105 No. 6, June 1993

Albitization of Plagioclase Crystals in the Stevens Sandstone (Miocene), San Joaquin Basin, CA., and the Frio Formation (Oligocene), Gulf Coast, TX: A TEM/AEM Study, W.G. Hirt, et al, P. 708-714.

Vol. 21, No. 7 July 1993

Thrusting of the Central California Margin Over the Edge of the Pacific Plate During the Transform Regime. Benjamin M. Page, et al, P. 577-672.

PALAIOS Vol. 8, 1993

Controversies on the Placement of the Cretaceous-Paleogene Boundary and the K/P Mass extinction of Planktonic Foraminifera. Olsson, R.K., et al, P. 127-139.

QUARTERLY JOURNAL OF ENGINEERING GEOLOGY Vol. 25, No. 4, 1992

Use of Down-Hole Focused Electric Logs to Investigate Saline Waters. Brassington, F.C. et al, P. 343-350.

A Review of the Attenuation of Trichloroethylene in Soils and Aquifers, Bourg, A.C. et al, P. 359-370.

SOIL SCIENCE SOCIETY OF AMERICA JOURNAL Vol. 57, No. 2

Water Infiltration into Exposed Fractured Rock Surfaces. Rasmussen, T.C., P. 324-329.

TECTONICS Vol. 12, No. 1 1993

The Origin and Evolution of the So. Snake Range Decollemont E. Central Nevada, McGraw, A.J., P. 21-34.

Vol. 12, No. 2 1993

Neogene Tectonics and Kinematics of W. North America, Wolcott, D., P. 3326-3333.

U.S. GEOLOGICAL SURVEY
Outside Publications

OP-14 - Architectural-Facies Analysis of Nonmarine Depositional Systems in the Upper Triassic Chinle Fm., S.E. Utah. Concepts in Sedimentology and Paleontology, by R.F. Dubiel, in the Three-Dimensional Facies Architecture of Terrigenous Clastic Sediments and its implication for Hydrocarbon Discovery and Recovery. A.D. Miall & others, 11-3-91, P. 103-110.

OP-15 - Shelf Sediment transport; An Overview with Applications to the No. Calif. Continental Shelf, D.A. Cacchione et al, in Ocean Engineering Science. (B. Le Mehaute, editor), in the Collection The Sea, New York: John Wiley & Son, 1990, P. 729-773.

DEADLINE FOR FALL ISSUE NOVEMBER 1, 1993

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

of the Pacific Section
American Association of Petroleum Geologists

FALL 1993 No. 4

PRESIDENT'S COLUMN

A number of changes have occurred at the State Board of Registration for Geologists and Geophysicists. The opening for Executive Officer of the Board has recently been filled by **Mr. John G. Parrish.** He received his PhD in Geology from the University of Wales, UK and spent most of his professional career as petroleum geologist with Tenneco and more recently with Santa Fe Energy Resources in Bakersfield, California.

New Board officers are **Mr. Art Letter**, president; and **Mr. Robert Lindblom**, vice-president. Mr. Letter is a public member of the Board re-appointed by the State Senate on June 1, 1991. Mr. Letter is currently the General Manager of the Tia Juana Valley County Water District. Mr. Lindblom is the Board's petroleum geologist appointed by Governor Wilson last year. Bob is currently a consultant in Menlo Park, having spent a long and fruitful career with Chevron. He is a past president of the Pacific Section AAPG and is currently on the Executive Committee of the National AAPG as Vice-President.

Other appointments Governor Wilson has recently made are **Monta K. Huber**, a public member and **Seena N. Hoose**, of Cupertino, a professional geologist member. Ms. Huber was a real estate broker in the Escondido area from 1974 to 1989. She served on the advisory board of the Bureau of Electronic and Appliance Repair from 1991 to 1993. Ms. Hoose is an engineering geologist for the Santa Clara Valley Water District, a position she has held since 1989.

THERE'S STILL TIME... Dalton Lockman and the 1994 Pacific Section Convention Committee are extending the deadline for accepting abstracts for oral or poster sessions. Even though it's a busy time of the year, take a few minutes and finish that abstract you've always meant to write. Writing an abstract is a good opportunity to organize your thoughts and share something of yourself. "Technology transfer" works both ways and is a good reason for your company to send you to Ventura. One idea gleaned from a presentation or a cocktail hour conversation will more than offset the time and money spent to attend. Beside, the Doubletree Inn has the best chocolate chip cookies in the world. Contact **Bill Bilodeau**, Technical Program Chair-entity, for abstract forms at (805) 493-3264.

- Reinhard J. Suchsland
President

PACIFIC SECTION AAPG IS EVOLVING

The move by so many geologists from the oil patch to the environmental arena has presented a challenge to the AAPG. Last year the Division of Environmental Geology was created as a subdivision of the AAPG. Since then, the Pacific Section and some of the local societies have made changes to accommodate this flourishing portion of the geological community.

The Pacific Section AAPG Executive Committee has strongly supported the creation of DEG and looked to it as a means of retaining the significant percentage of our membership that has moved into groundwater cleanup in the last half-dozen years, as petroleum exploration and development in California and the rest of the Pacific Section have declined. Several of our affiliated societies are surviving only through the continuing participation of environmental geologists.

During the past year the SJGS has developed a successful format for its environmental programs. Every other month the SJGS schedules a DEG talk from 5 to 6 pm, before its regular monthly program (attitude adjustment at 6; dinner at 7; talk at 8). The DEG talk draws 40 - 50 people and promotes a continuing contact between petroleum and environmental geologists. The SJGS has also sponsored two (one and two day) short courses on groundwater hydrology and this year ran the 40-hour OSHA course.

We are encouraging environmental geologists to join PS-AAPG in order to receive its newsletter, convention announcements, etc. The PS-AAPG bylaws do not require membership in national AAPG in order to vote or hold office, so that environmental geologists can and do join PS-AAPG on an equal footing. The PS-AAPG membership application now has a PS-DEG (only) category as well.

In addition to maintaining close relationships with affiliated local societies as their orientation evolves from petroleum exploration to environmental geology, Pacific Section is trying to build a working relationship with non-affiliated local societies whose membership has always been environmental, geotechnical, or academic. PS-AAPG is amending its constitution and bylaws so that it might work with such societies in sponsoring the annual conventions and perhaps in our publication sales and newsletter.

- Tom Wright

NORTHERN CALIFORNIA

NCGS 50TH ANNIVERSARY CELEBRATION

On Sunday evening, 12/12/93, NCGS will host a special celebration to commemorate the organization's 50th anniversary. The venue will be the Museums at Blackhawk and includes dinner, live music (listening), access to both museums, and a presentation by Gordon Oakeshott (40-year member) on the early history of the NCGS and the geology of Northern California.

NCGS is encouraging all members and spouses or significant others to attend this special event. We also would like non-NCGS members of the general Northern California geological community to attend and share a special evening of social, historical & gastronomic pleasures with NCGS. Upcoming newsletters will contain details regarding the 50th Anniversary Celebration.

Thanks for your cooperation in this matter. If you have any questions, please contact Mary Rose Cassa (NCGS Pres.) at (510) 540-3818.

COAST

MONTHLY MEETING SPEAKER SCHEDULE:

11/16/93 - Robert Ripperdan - U.C.S.B. "Rapid Changes in Carbon Isotope (δ^{13}) Composition and Mass Extinction Events: Is There a Common Paradigm?"
12/14/93 (Note date change) - "Guest Night" Dale Kunitomi & Bob Micheals - Consultants "Kamchatka - The Russian Ring of Fire"
1/18/94 - Don Marcus - EMCON Assocs. "Geology & Remediation of Contaminated Bedrock Aquifers, Talley Corp. Site; Newbury Park, CA"
2/15/94 - Craig Nicholson - Institute of Crustal Studies, U.C.S.B. - "A New Tectonic Model for the Rotation of the Western Transverse Ranges: A Tectonic History of California for the Last 20 Million Years"
3/15/94 - Helmut Ehrenspeck - Dibblee Foundation - "The Conejo Volcanics: Field Relationships and Depositional Environments"
4/5/94 (Note date change) - AAPG Distinguished Lecturer - Gregory Ulmishek - USGS - "Geology and Exploration Potential of Major Petroleum Basins in the Former USSR"
5/17/94 - Eugene Fritsche - CSU Northridge - "Middle Tertiary Sedimentary Relationships Between the Santa Ana and Santa Monica Mountains as Related to the Development of the L.A. Basin"

NWPA

BEND CONFERENCE EXCEPTIONAL

Approximately 70 persons registered for the Bend Conference held at The Inn of the Seventh Mountain, Sept. 26-28. A distinguished group of speakers gathered to speak on geology and potential energy supplies for the Pacific Northwest.

A set of Conference Abstracts can be obtained by writing NWPA, P.O. Box 6679, Portland, OR 97228-6679. Price for the Abstracts is $5.00, which includes postage.

OREGON ENERGY LEGISLATION

The August 1993 NWPA Newsletter commented on Oregon Legislature Senate Bill 1016 having to do with exempting Underground Storage projects of 50 mmcf/d or smaller from going through the State Energy Facility Siting Council (EFSC) hearing process. Probably more important to potential storage programs was the transfer of regulation of drilling, testing, etc., from the EFSC to DOGAMI. The Oregon Dept. of Geology & Mineral Industries will be writing regulations dealing with this new authority.

NEW MEMBERSHIP DRIVE

Bob Pinotti, NWPA member from Oregon Natural Gas Devel. Corp., is heading up a drive for new membership. You can help by contacting Bob at (503) 220-2573, if you know of someone who may be interested, let's contact our industry friends.

SACRAMENTO

The Sacramento Petroleum Association (SPA) meets at noon on Wednesdays by announcement (generally the 2nd & 4th Wednesdays of the month) at the Hungry Hunter Restaurant, 450 Bercut Drive, Sacramento.

The SPA publishes a monthly newsletter which is mailed to all paid members. Annual dues are $10, payable to SPA, P.O. Box 254443, Sacramento, CA 95865-4443.

The SPA President is Russ Bertholf, H.W. Bertholf, Inc., 1601 Executive Ct., Ste. 1, Sacramento, CA 95864. Telephone: (916) 485-9164. New officers will be elected in January, 1994.

Upcoming Events: **December 3rd**, API Dinner Dance, Holiday Inn North, Sacramento. **December 10th**, Gas Patch Party, Elks Club, Woodland.

SAN JOAQUIN

As a result of reorganization at ARCO Oil & Gas, the SJGS has lost two of its officers. **Rusty Riese** (President) and **Mike Dumont** (Secretary) will be relocating to Houston and, effective immediately, will no longer be able to carry out their duties on the Executive Committee. In accord with the bylaws of the SJGS, Vice President **Fred Bair** (Chevron) will assume the duties of President. President-Elect **Terry Thompson** (Bechtel) will assist Fred with the additional responsibilities. **Mike Clark** (ARCO) was selected to fulfill the '93/'94 term as Secretary.

The December 14th dinner meeting of the SJGS will feature a talk by **Wayne Narr**, Chevron Overseas Petroleum, Inc. (COPI), on the Upper Magdalena Basin in Colombia.

January 11th DEG/SJGS: Two part lecture on environmental & industry analytical methods for hydrocarbons by **Ryan Nakatani** of Core Laboratories.

February 8th Chevron Overseas Petroleum Inc. (COPI) will present a talk on Tengiz: Super Project.

March 8th Geothermal Neogene Extension Indian Wells Valley, China Lake Naval Weapons Center, **Frank Monastero.**

For reservations call **Mike Clark** at 632-6254.

ALASKA

No report. Alaska Geological Society, P.O. Box 101288, Anchorage, AK 99510.

LOS ANGELES BASIN

No report. Los Angeles Basin Geological Society, 23113 Plaza Point Drive, Laguna Hills, CA 92653.

ANNOUNCING...
Four important new geologic maps from the Dibblee Geological Foundation

In late November 1993, Dibblee Geological Foundation goes to press with the final three, long-awaited geologic quadrangles by Tom Dibblee in the central Santa Monica Mountains: **MALIBU BEACH, POINT DUME** and **THOUSAND OAKS.**

These three maps complete the first bedrock geologic maps of the entire 9-map Santa Monica Mountains, published at a uniform 1:24,000 scale, and with a consistent color scheme. Never before have the diverse sedimentary and volcanic units and their complex structural relationships been mapped in such a consistent and understandable manner, and for the first time ever, this entire region has a coordinated stratigraphy and structure as mapped and interpreted by one man. Each map features two structural cross-sections.

These maps are awaited not only by the scientific community. Because they encompass large areas of commercial and residential development (and post-fire redevelopment) along with major private preserves and public parklands, they will be of great practical value to geotechnical, environmental geology, and related fields.

VAL VERDE is the fourth map going to press at this time. This geologically important area contains several major and minor oil fields, and adjoins crucial transportation, utility and pipeline corridors. Much of this region is slated for large-scale commercial and residential development. Our map presents the first full-color geologic overview, complete with cross-sections, of this vital region of southern California.

♦ This is a unique opportunity for you, your company, institution or organization to support Tom Dibblee's work.

♦ It is also your **LAST** opportunity to be recognized in print for helping to publish the geology of the Santa Monica Mountains region, because after these maps are printed, we'll focus on northerly and inland areas of Ventura, Los Angeles and Santa Barbara counties.

We hope you can help with the printing of one or more of these maps with a nominal individual or corporate pledge, contribution, or grant of $500/$1,000, respectively ($500 for academic departments). We will acknowledge your support in print on the map(s) of your choice, in your individual, corporate or institutional name, or in the honor or memory of anyone you select.

Please remember that the Dibblee Foundation is a tax-exempt 501(C3) California non-profit organization. This is the perfect time to make a year's end, tax-deductible donation or business contribution.

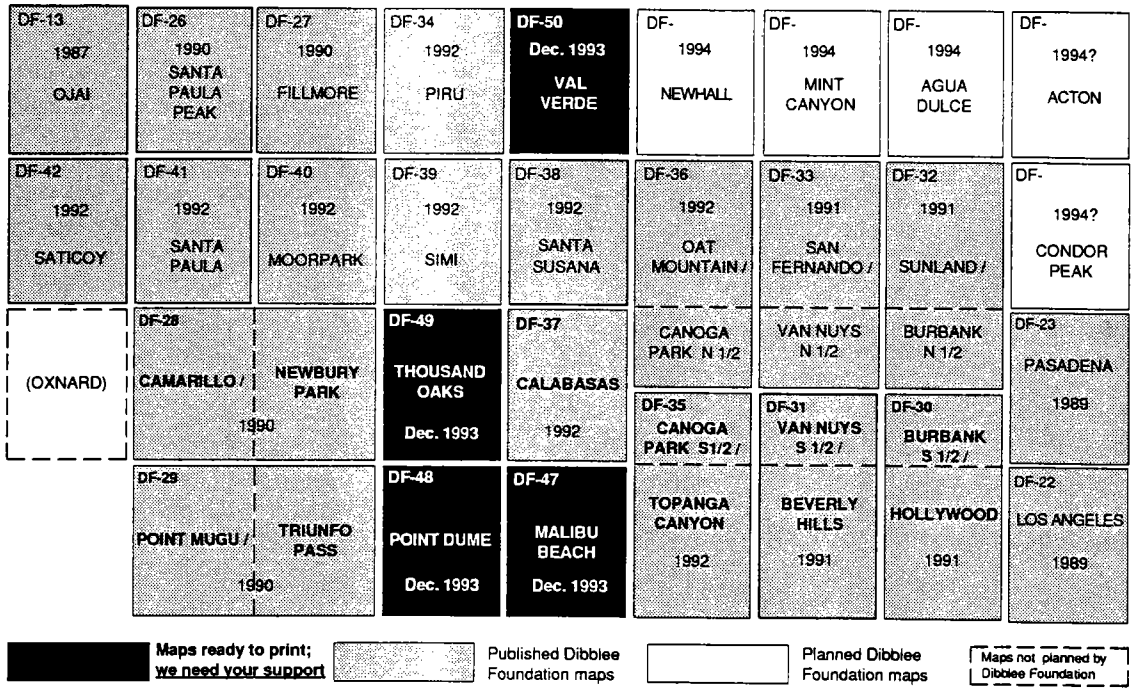
WE'LL BE IN PRESS AS YOU RECEIVE THIS NEWSLETTER. IF YOU CAN HELP, WE NEED YOUR DECISION BY ABOUT DECEMBER 20, 1993!!

For further information, please write or call Helmut Ehrenspeck, Editor, Dibblee Geological Foundation, P.O. Box 60560, Santa Barbara, CA 93160, Telephone: (805) 968-0481.

Fall 1993

New **Dibblee Geological Foundation Maps of**

Southeastern Ventura to Los Angeles Counties, California



Geologic maps of southeastern Ventura Co. and Los Angeles County shown above (shaded pattern) are available from the Dibblee Foundation. They are printed in full color (also available in b/w) over US Geological Survey 1:24,000-scale topography. Some maps are printed oversized to retain the continuity of physiographic and geologic trends of this region. All geology is by Thomas W. Dibblee, Jr.

For further information, please contact Helmut Ehrenspeck, Editor
Dibblee Geological Foundation, P.O. Box 60560, Santa Barbara CA 93160 ☎(805) 968-0481

The Dibblee Geological Foundation is a non-profit 501(C)3 California educational organization. Contributions are tax-deductible.

SEDIMENTARY DEPOSITIONAL SYSTEMS MODELS IN GROUNDWATER AND ENVIRONMENTAL STUDIES

by: Linda V. Smith

INTRODUCTION

The principles used to create conceptual models on the distribution of spatial trends and heterogeneities in porous media apply to both petroleum and groundwater-related studies. Site-specific conceptual models are comprised by three main components: geometric structure, physical and chemical processes, and boundary and initial conditions (Tsang, 1991). This paper addresses the application of the large body of sedimentologic literature and traditional depositional systems models to the problem of defining the geometric structure for geologic input into computer simulation modeling of groundwater solute transport.

In the history of groundwater-modeling literature, there has been a gradual recognition that most geologic systems are not homogeneous and isotropic; that heterogeneity may be fractal in nature and will not become homogeneous with any size of averaging volume (Wheatcraft and Tyler, 1988); and that accurate representation of heterogeneity is critical to analysis of the flow field (Anderson, 1989). Work by Miall (1988) on fluvial systems whereby "architectural elements" were defined with bounding surfaces at six different scales has provided a framework for the concept of appropriately-scaled nested grid blocks. Anderson (1991, 1989) has used sedimentologic depositional systems models in her research, progressing from regional-scale heterogeneities during the mid-1980s to local and site-specific heterogeneities in recent papers.

Generally, emphasis in groundwater modeling is placed on determination of hydraulic conductivity (k), because this parameter can range over several orders of magnitude (Anderson, 1989). Horizontal variability is referred to as K_H, and vertically variability as K_V. The case history of a confidential refinery site is briefly summarized herein to illustrate the application of depositional systems models to determination of geometry, K_H and K_V.

SITE HISTORY

The generalized refinery area depicted in Figure 1 is located in California. Groundwater flow directions as shown on Figure 1 are to be southeast in the southeastern part of the refinery area, but trend more easterly across the central portion of the study area, to the south. The site is roughly 2-¼ miles across by 1-½ miles in the north-south direction.

Near-surface stratigraphy is Quaternary, with a think veneer of Holocene sediments underlain unconformably by Upper Pleistocene clastics. There are several discontinuous perched zones in the shallow section; the first significant aquifer occurs in basal Upper Pleistocene, underlain unconformably by aquifers in Lower Pleistocene clastics.

Environmental boreholes were first drilled in the refinery area in 1985; by 1989 sufficient boreholes and monitoring data had been collected to map the distribution of free product on the groundwater, as shows in Figure 2. The greatest thickness of free product (35 feet) occurs in the southeast corner of the refinery area. Maps of dissolved phase benzene concentrations at six-month intervals during 1989 and 1990 are shows in Figures 3, 4, and 5. The effects of a cleanup operation involving pumping wells in the southeast corner can be seen in the development of a "saddle" near the recovery wells; in the loss of the 20 ppm contour; and in the diminution of the 15 ppm contour. Maps prepared for toluene, xylene and BTXE showed essentially the same contour shape and cleanup progression.

GEOMETRIC STRUCTURE

The north-south linearity of the 1989 benzene contours, in contrast to the east/southeast groundwater flow direction, suggested the possibility of a preferential

(Continued on page 5)

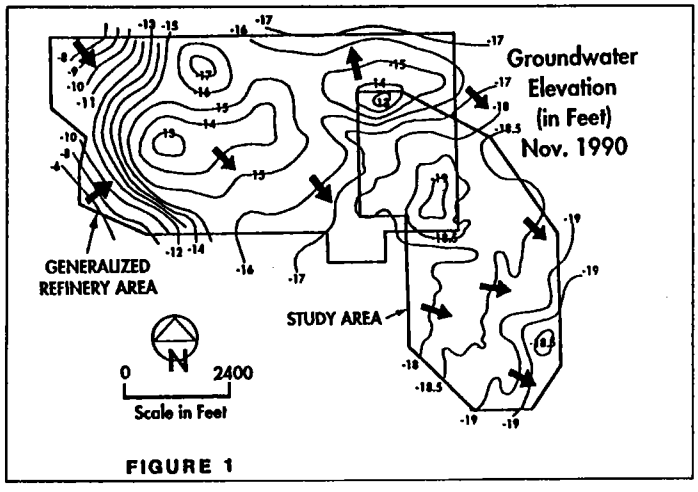


FIGURE 1

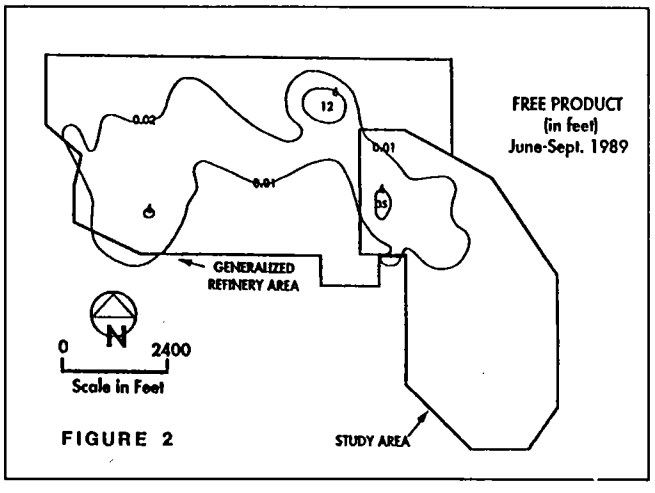


FIGURE 2

Continued from page 4)

solute transport direction controlled by stratigraphy (surface faulting is not a factor in the study area).

Geologic data obtainable from environmental borehole logs and monitoring wells is extremely limited because generally there is no wireline log, no paleontology, and no hint at sedimentary structures. Three-dimensional data is equally limited because there is no seismic; and since wells rarely penetrate the total thickness of an aquifer, isopach maps cannot be made.

In order to investigate stratigraphic control, all possible information must be extracted from the detailed grain-size descriptions inherent in the Unified Soil Classification System (USCS) used by environmental and engineering geologists to describe lithology. In addition, preliminary review of the regional geologic literature is required to identify stratigraphy, the general type of paleoenvironment to be expected, and the location and nature of any shallow unconformities or faults.

A representation of three-dimensionality can be obtained by preparation of a fence diagram, which has the advantage that prior knowledge of depositional or structural trends is not required for orientation of the grid. For large sites where boreholes may be drilled in phases over many years, panels can be added to the diagram as the assessed area expands. Boreholes drilled in areas of previously prepared panels can be compared to the existing interpretation for validation or revision. The fence diagram can be used to plan placement of additional boreholes where information is required, and to plan the remediation program as the project progresses.

Anderson (1991) demonstrated that channeling of contaminants occurs when preferential flow paths exist. Under conditions of primary porosity and permeability, control for fluid migration is distribution and internal properties of sedimentary facies. Inference of relatively high or low permeability from the USCS classification is subjective, but can be based on two alternative criteria: distinguish predominantly fine-grained materials from all other sediment; or, distinguish clean sand and gravel zones from all other materials (Johnson and Dreiss, 1989)

For the refinery site example, the initial detailed fence diagram panels were prepared for the central part of the study area. Generalized versions of a portion of these panels are shown in Figure 6. Clean sand (USCS categories SW & SP) and gravel zones were distinguished from sediments containing fines, as indicated on Figure 7. This interpretation highlights the spatial structure of zones of high apparent permeability. Trends in grain-size changes within the clean sand categories were also mapped, consistent with standard depositional systems models. The plan view of the entire fence diagram is shown in Figure 8.

GRAIN SIZE SCALES

It should be noted that sedimentary depositional systems models are based on the Udden-Wentworth scale, but the USCS classification uses the U.S. Army Corps. of Engineers grain-size scale. The two scales are comparable in the very fine-grained and coarse-grained portions of the

(Continued on page 6)

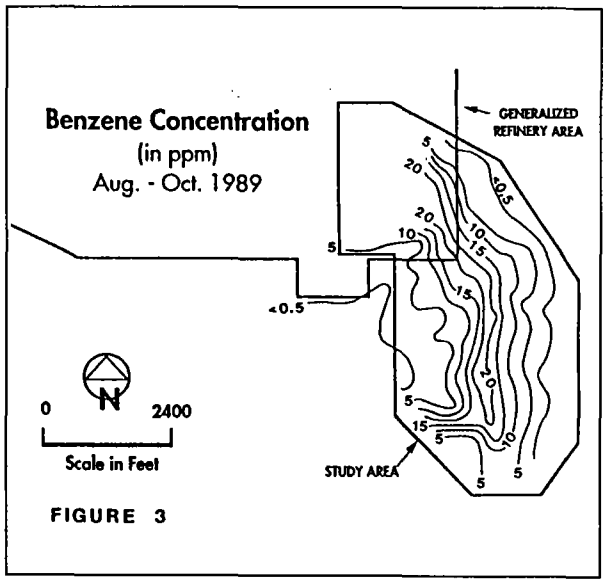


FIGURE 3

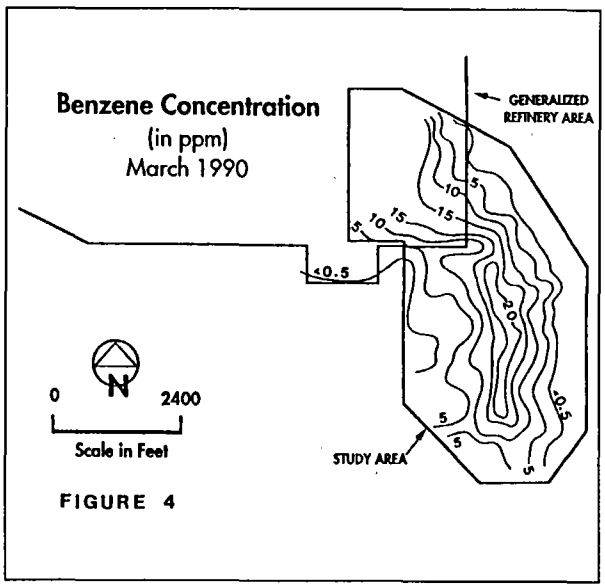


FIGURE 4

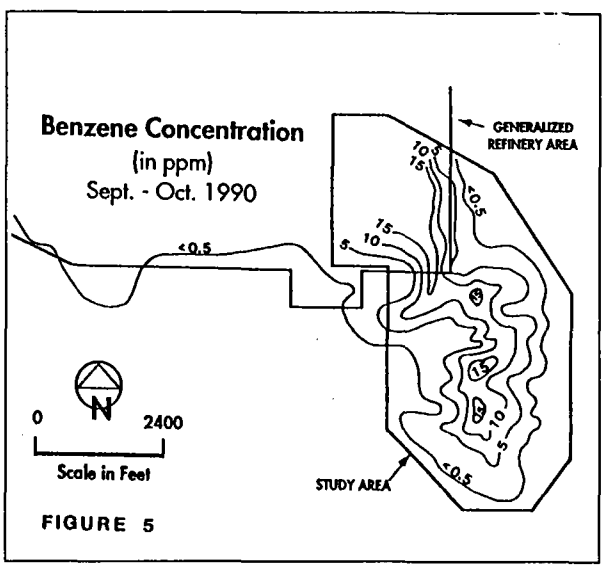
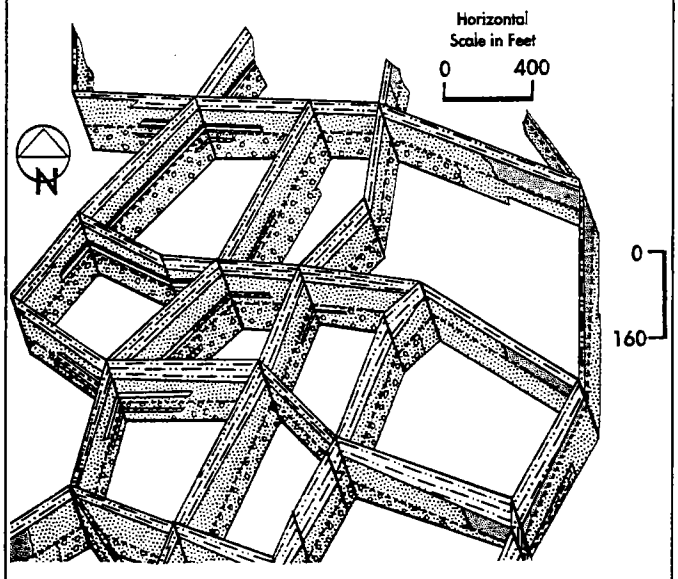


FIGURE 5

FIGURE 6



Fence Diagram — Generalized Panels

Legend for Fence Diagram

Detailed Panels

Generalized Panels

- Gravel, some Cobbles
- Clean Sand (SW/SP): Medium to Coarse, some Very Coarse with small Gravel
- Clean Sand (SW/SP): Fine to Medium
- Clean Sand (SW/SP): Very Fine to Fine
- Silty to Clayey Sand (SM/SC)
- Silt (ML)
- Clay (CL)
- Clay with Organic Content (CL/CH/OL)
- Silt, Clay, some Silty to Clayey Sand (ML/CL/SM/SC)
- Perched Zone Water Level
- First Aquifer Water Level

FIGURE 7

(Continued from page 5)

scale, but differ considerably within the "sand" category. Very fine, fine and medium sand by Udden-Wentworth standards is considered to be fine sand by Corps. of Engineers standards. Similarly, coarse to very coarse sand, and granules to pebbles on Udden-Wentworth are equivalent to medium sand, and coarse sand to gravel on the Corps. of Engineers scale, respectively. Grain-size descriptions on Figure 7 use the USCS/Corps. of Engineers terminology, as obtained from the original borehole logs.

The effect of the terminology differences between Udden-Wentworth and USCS/Corps. of Engineers criteria is that the contrast between fines and "sand" to "gravel" is much greater that would be expected in the standard sedimentology literature. This fact must always be kept in mind when using USCS borehole logs to infer sedimentary depositional systems.

DEPOSITIONAL SYSTEMS INTERPRETATIONS

Excluding the uppermost fine-grained unit shown on Figure 6 (which may be Holocene), the generalized fence diagram depicts an overall sandy section which fines upsection and laterally to the east and west. The approximate boundary between medium to coarse clean sand and gravel lithology, as opposed to very fine to medium clean sand lithology, is shown on Figure 8. This lithology, in conjunction with the regional literature, the scale and geometry shown on Figure 8, eliminates estuarine sequences, tidal flats, lagoons, swamps, deltas, and meandering fluvial systems as possible interpretations.

The dashed line on Figure 7 shows the water level depth below the surface of the aquifer of interest. Thickness of sand from the base of the deepest well (which does not reach the base of the aquifer) to the clay below the perched zones is about 90 feet. The detailed fence panels (now shown herein) depict cyclic gravel zones. The thickness and cyclicity suggest a sand-rich, low-sinuosity, multiple-channel fluvial system, such as the diagrammatic example shown on Figure 9 (Cant & Walker, 1976; Berg, 1981; Miall, 1982; Walker & Cant, 1984). Typically in such a system, the fine-grained deposits at the top of each cycle will be eroded off with the next flood, producing the gross morphology of a sheet sand; channelization is caused by internal structures and grain size changes. The columnar section associated with this type of system is shown in Figure 10.

CONCLUSION

The scale and geometry of the components of a depositional system can be used in groundwater modeling in conjunction with the concept of nested grid blocks. For fluvial systems, Table 1 lists the thickness and lateral extent to expect for "architectural elements" ranked by order of bounding surface (Miall, 1988). Sizes 1, 2, and 3 might be seen in small sites. The fence diagram for the refinery example shows sizes 4 and 5: bar complexes and a sheet channel.

(Continued on page 7)

TABLE 1

Fluvial Architectural Elements

Order of Bounding Surface	Thickness (in Feet)	Lateral Extent	Element Example
6	0-100	Basin-Scale	Member, Submember
5	35-65	3300 ft X 6 mi	Sheet Channel
	35-65	800 ft X 6 mi	Ribbon Channel
4	10-50	1000 ft to 2 mi	Bar Complex
	2-50	35 to 3300 ft	Bar Top, Minor Bar
3	2-35	330 X 330	Bar Subunits, Erosion Surfaces
2	15	330 X 330	Cross-Bed Cosets
1	2-7	330 X 330	Cross-Beds

Adapted from Miall, 1982, 1988

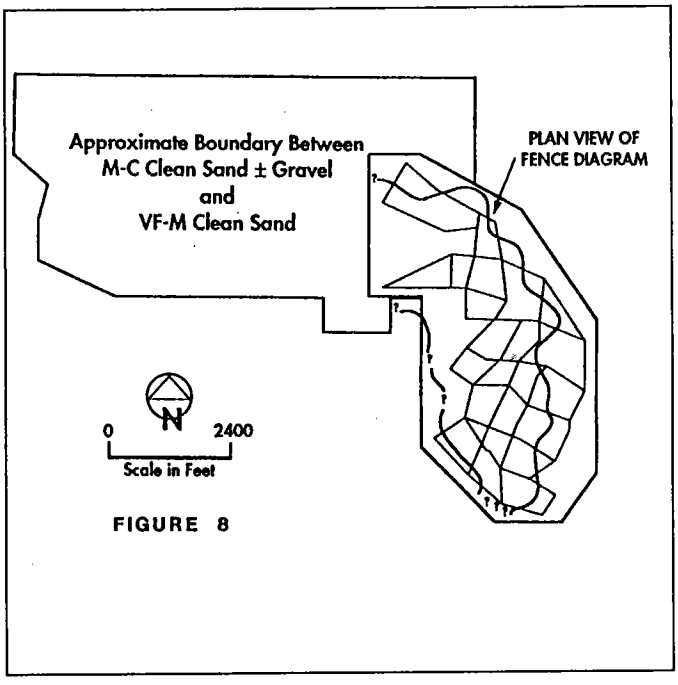


FIGURE 8

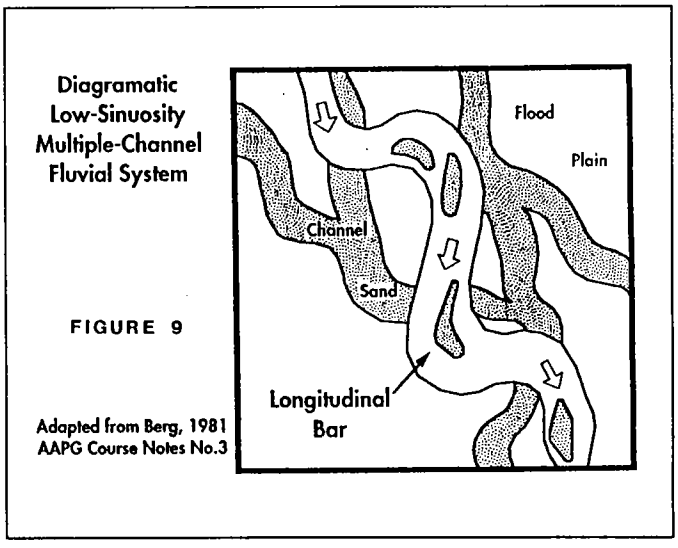


FIGURE 9

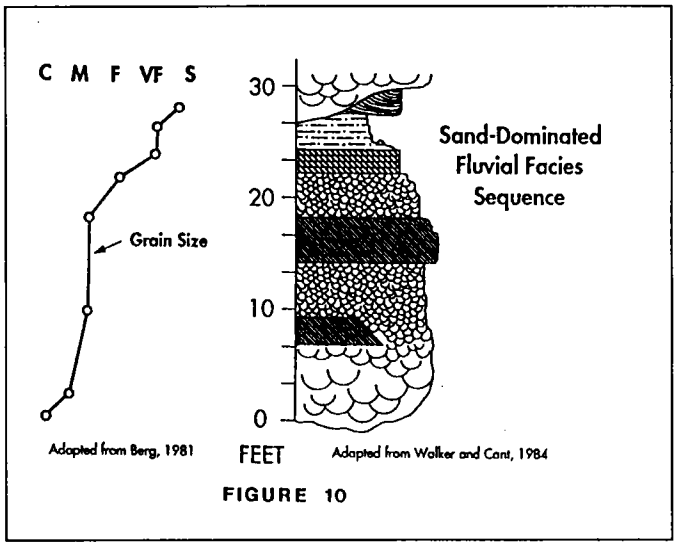


FIGURE 10

(Continued from page 6)

Predictions can be made based on elements and bounding surfaces: hydraulic conductivity will be greatest toward the center of the element and least near the bounding surface. Horizontal trends (K_H) for representation of the flow field can be obtained from sedimentologic facies models; vertical variability (K_V) can be obtained from regional and site-specific stratigraphic profiles (borehole logs). Hydrogeologic field tests designed using sedimentologic facies models can provide validation for the parameters used in the subsequent computer code.

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ACKNOWLEDGEMENTS

This paper is a condensed version of a talk presented during the May 1993 combined AAPG-SEPM-SEG Pacific Section Convention in Long Beach. Acknowledgements are made to SCS Engineers and Richard C. Slade & Associates for permission to use data obtained from a confidential site as an example to illustrate the sedimentary depositional systems approach to groundwater and environmental studies.

DELEGATES' CORNER

Readers of Don Tobins Presidential column in the AAPG Explorer, National AAPG's newsletter, have become aware of a number of things that the National AAPG has been doing to aid the under and unemployed members of AAPG. Examples include compiling a registry of geologists available for World Bank funded projects, lobbying for US Government Title III funds for job retraining, compiling information for members interested in obtraining secondary school credentials for teaching, and many other "behind the scenes" efforts to help. Recently National AAPG, along with several other national professional organizations such as SPE, has arranged to have JOB BANK USA provide an "automated employment service" to their membership. JOB BANK USA is a private company separate from AAPG.

This service is somewhat analogous to the employment service AAPG provides at the annual convention in that it is a way to match employers needs to members resumes. Basically members submit their resumes to JOB BANK USA where it is entered into a database. A hiring company then submits its job specifications, a database search is made by a professional recruiter for candidates, and resumes of the qualified candidates is sent to the hiring company usually within one to two days.

There is an introductory fee for AAPG members of $27.00 to enroll in the data base and a reasonable search fee for potential employers. JOB BANK USA is located in McLean Virginia and maintains databases covering numerous professionals at managerial through technical levels. They have a client list ranging from international Fortune 100 companies to regional and local firms.

More information will be forthcoming in future issues of the AAPG Explorer. Although National AAPG will not be directly involved with the program, they will be actively encouraging companies to take advantage of the database when they are hiring. Companies interested in hiring and anyone interested in submitting their resume should contact JOB BANK USA directly at (800) 296-1USA.

- Bob Countryman
SJGS Delegate Chair

DEG ANNOUNCES BEST PAPER AWARD FOR NEW ORLEANS

The winner of the group's first "best paper" award has been announced by the Division of Environmental Geosciences.

James Waldron, of Chevron USA, Bakersfield, California has won for the paper "Impact of Hydrogeology on Contaminant Migration and Abandonment of Production Impoundments: Case Histories in Kern County, California", presented at the AAPG annual meeting in New Orleans.

His co-author was **Laura M. Bazeley**, WZI Inc., Bakersfield, California.

NEWSLETTER ANNOUNCES STAFF CHANGES

We would like to announce some recent newsletter changes. Welcome **Larry Knauer**, who takes over from **Joann Conard** as Co-editor. Special thanks go to Joann for her skillful guidance and contributions to improve the quality of the newsletter over the past two years.

Larry is former president of the San Joaquin Geological Society (SJGS) and has been active in the Society for a number of years. He is a Geologist for Bechtel at Elk Hills Naval Petroleum Reserve.

Tom Berkman
Newsletter Co-Editor

NEW MEMBERS

COAST GEOLOGICAL SOCIETY

Jeffrey C. Neuman
Camarillo

Perry W. Russell
Ventura

SAN JOAQUIN
GEOLOGICAL SOCIETY

Albert S. Wylie, Jr.
Bakersfield

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

GEOLOGIC MAPPING NOMINATIONS INVITED

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

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

Nominations of candidates to be considered for award of the Dibblee Medal are now being solicited. Nominations should include the name of the candidate, biographical data, a description of the geologic mapping, and the names of at least two geologists who support the nomination. Mail each nomination and supporting data by March 1, 1994 to:

DIBBLEE GEOLOGIC FOUNDATION
P. O. Box 60560
Santa Barbara, CA 93160

The first Dibblee Medal will be awarded at the meeting of the Pacific Section of AAPG in May 1994, at Ventura, CA.

The Dibblee Foundation is a non-profit corporation chartered in California in 1983 for the purpose of publishing Tom Dibblee's geologic mapping. To date, the Foundation has published 47 maps covering sixty-five 7-½ minute quadrangles with several hundred more awaiting publication.

1994 Pacific Section Meeting
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MARK YOUR CALANDER
APRIL 27 - 29, 1994

On the beach - for the first time at the

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Hosted by The Coast Geological Society

LOCAL GEOLOGIST HITS IT BIG ON PBS

Pacific Section member **Bob Michael** has been to Russia (with a friend), and is the beneficiary of two computers, a video camera and several books -- all from casually glancing through his copy of the KCET (Los Angeles PBS station) Program Guide for May, 1992.

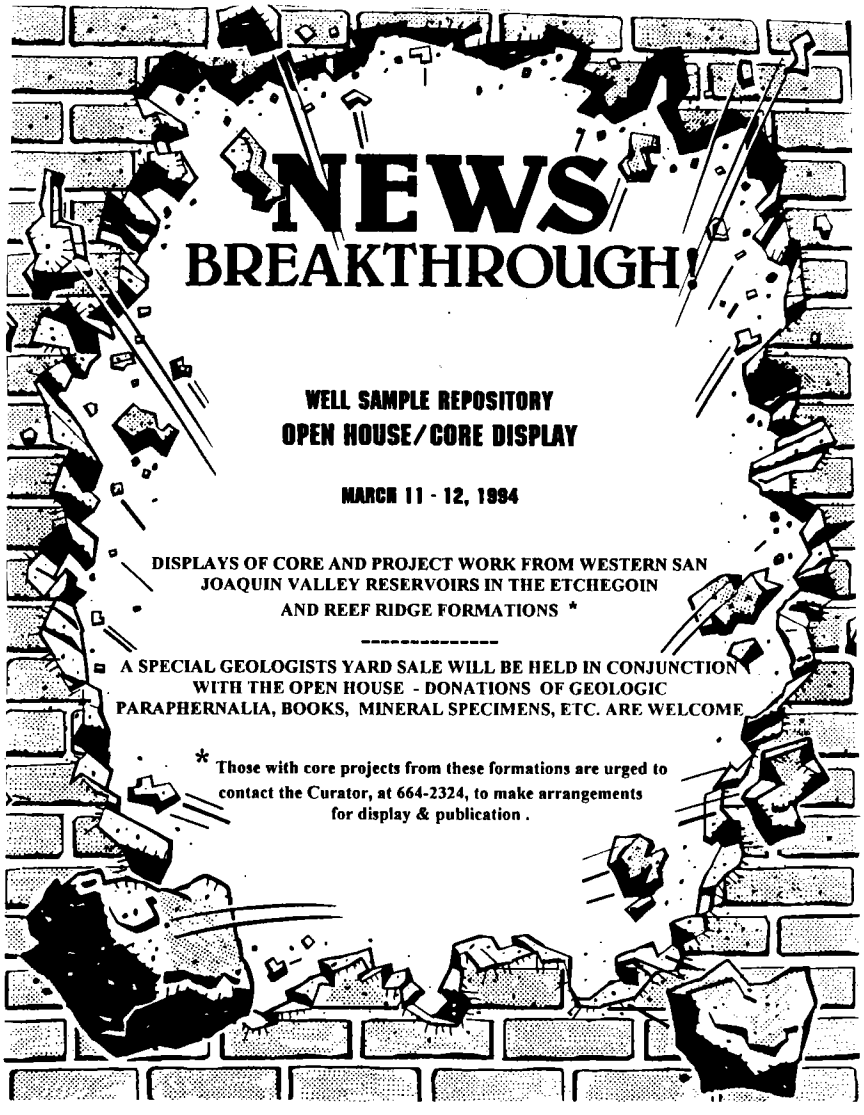
"I noticed a little filler box", the Santa Barbara resident recalled, soliciting contestants for the 'Great NOVA Science Quiz', to be aired in fall 1993 to celebrate the 20th anniversary of the PBS science series. I dashed off a note, which was neither lengthy nor inspired, and forgot about the whole thing."

In November 1992, he got a phone call from WGBH in Boston, the home of NOVA. Would he like to drive down to CBS Television City in Los Angeles for a preliminary contestant audition? With an attitude of "what do I have to lose but gas money", he took the time off for the drive to Hollywood, where he and about thirty other science fans took a qualifying knowledge test, stood up and introduced themselves, and went through a mock game format. About 200 people from around the country who had answered the ad went through similar screenings in several locations.

A couple of weeks later, Boston phoned; would Bob like to come down to Television City (where WGBH had contracted out the actual production of the show) to be a real contestant? So, on December 15th last year, he headed down for the taping, in which two teams of four contestants each went through three elimination rounds until one finalist from each team was left for the one-on-one showdown, Bob and a grandmotherly lady from South Texas. The final tie-breaker was in the form of a video screen shown to each finalist with a detailed "what's wrong with this picture" cartoon. Bob had a scene in a science lab, and the other contestant had a living room in a nice home. Each drawing had ten features which contradicted basic principles of chemistry, physics or common sense; the contestants had to circle the errors and explain why they were wrong. Bob, going first, got eight out of ten; his opponent got six out of ten, and Bob walked off with his grand prize, an Earthwatch expedition for two anywhere in the world Earthwatch goes.

Bob chose "Kamchatka Volcanoes", a volcanological expedition to an explosive (Mt. St. Helens type) caldera on the remote peninsula in the Russian Far East, in part because of his fascination with volcanoes and partly because Kamchatka is one of the most remote and hard-to-get-to places (short of Antarctica) on Earth; in fact, until recently it was absolutely off limits to all outsiders. He spent three unforgettable weeks there in July and August. One of the highlights was running into friend and fellow Coast Geological Society member **Dale Kunitomi** in the caldera where the Earthwatch group was camping and working! Dale was there with a tour group made up mostly of educators from the West Coast.

The late pop artist Andy Warhol once said, "Everyone gets to be famous for fifteen minutes." Bob did Andy four times better; his hour of nationally-televised fame was on PBS on Tuesday night, October 5th. "And to think", Bob concluded, "All of this came from flipping through my PBS program guide one evening!"



COMING EVENTS

JANUARY 21ST SEMINAR TO ADDRESS LEGAL, ENVIRONMENTAL & GOVERNMENTAL WATER ISSUES

For the sixth consecutive year, leading water experts will participate in an all-day conference in Santa Barbara that will provide up-to-date information on the legal, environmental and governmental water issues affecting California. The conference, sponsored by UCSB Extension, will be held on Friday, January 21st from 8:30 am to 4:30 pm at Fess Parker's Red Lion Resort in Santa Barbara.

The cost of the all-day event is $185 per person which includes lunch and a course syllabus. The course is approved for seven hours of Minimum Continuing Legal Education. Registration deadline is January 10th. For more information or to register, call (805) 893-4143.

FIELD TRIPS

Sponsored by:
Bureau of Land Management

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

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

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

To register for trips, call Dr. Gregg Wilkerson at (805) 861-4210.

1994 SCHEDULE

San Andreas Fault: Gorman to Wallace Creek - Sat., 1/8/94

San Andreas Fault: Wallace Creek to Parkfield - Sat., 2/5/94

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

Mother Lode '94: Jamestown to Copperopolis - Sat., 4/9/94

DEADLINE FOR WINTER ISSUE FEBRUARY 1, 1994

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