Pacific Petroleum Geologist NEWSLETTER

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Message from the President

Mike Wracher

In this month's letter I am sharing my thoughts about the importance of field work in maintaining our technical edge as earth scientists. As I describe below, opportunities for field work range from self-guided outings, to trips that we will offer at the 2007 convention.

Field work can keep our creative juices flowing and at the same time root us in reality. In peer discussions, generally the person who chimes in with "well I've been there and looked at those rocks" has the power to stop a discussion in its tracks and guide it into a potentially more fruitful direction. There are many ways to keep your field skills sharp and your internal geologic regulator up to snuff. You can organize work group or company field trips, take a field oriented short course, attend a convention field trip, or just head out after work with a geologic map and your trusty Brunton. With a little pre trip research and some maps, you can start making observations, collecting data and slip into that comfortable field pace. It's like riding a bike; once you get going again things start to unfold. You can go alone, although personally, I've found that going with at least one other geologist makes for more constructive discussions on the outcrop. Another tried and true method to get some field time in is to integrate it into a vacation. Although we have great exposures along the west coast, you owe it to yourself, and your family, to visit the Colorado Plateau.

My wife and I take a long camping vacation every year. We've been to many areas of the western U.S. and parts of Canada, but we keep gravitating back to the Plateau. Here unparalleled natural beauty and geology is wrapped up in one package. Magnificent exposures allow for investigation and discovery at widely different scales. For instance you can ponder planetary scale revolutions like the end of the age of Carbonates, investigate depositional systems by following Kayenta stream channels meandering along the edge of the Wingate sand sea, or study millimeter scale changes in bedforms that have the power to redirect fluid flow in reservoirs.

In this age of ubiquitous computing power we need to strive that much harder to get back to the outcrop, to help ground or verify what we are attempting to model. To help our members accomplish this, the PS-AAPG is sponsoring three field trips at the National Convention in Long Beach. These trips include "Oil on their Shoes" a trip to the oil seeps of LA and Ventura Counties; another is a holistic look at three heavy oil fields along the East Flank of the San Joaquin Basin, Mt Poso, Round Mountain and Kern River, and finally a THUMS island tour. In addition to the PS-AAPG sponsored trips there are 18 other trips that can satisfy your appetite for field based learning, from Baja to Palos Verdes. Find one that addresses geologic issues you may be working with now, and see what the rocks say.

The Convention not only offers the opportunity to look at the rocks but to then sit in on a technical session that discusses what you see in the field. To update you on these sessions, Jon Schwalbach, the General Technical Chair, informs me that we have over 1140 abstracts submitted for the convention.. This is a good sign that we are on track for a very successful meeting. Take a look at the field trips, technical sessions and short courses by logging onto our website (psaapg.org) and follow the links to the convention.

Thanks
Mike

Message from the HOD

Larry Jones on "Changes"

I appreciate the opportunity to share some of my thoughts with the Pacific Section. During 2006-2007 the AAPG President was planning a year with emphasis on incorporating and streamlining projects that were commenced the last two years. However, multiple new initiatives will need to be dealt with by the House of Delegates.

At the recommendation of the Advisory Council and the Executive Committee, three specific proposals have been forwarded to the Constitution and ByLaws Committee for reporting of their findings to the HOD Executive Committee on December 2, 2006.

These deal with; (1) a graduated dues structure, which would be applicable to all members, both Sections (domestic) and Regions (international); (2) a revision of certain rules that govern "Petition Candidates" for AAPG offices; and (3) a revision suggested by certain Regions, to change Associate membership to Affiliated membership. These will all be considered and, if recommended, will move on to the House of Delegates at Long Beach.

We need to attract new qualified members to AAPG, who will be active and provide for AAPG growth. However, many of these candidates, who reside in both Sections and Regions, cannot afford our present dues structure. So, we will study this carefully. This may cause some "required" changes in how AAPG does its business.

I had some recent experience with "required" changes. During the AAPG Annual meeting in Houston, I experienced a serious operation and subsequent stroke. This occurred during the busiest time of my professional life. It was a setback, but through changes in my routine and faith, I have been able to resume much of my "busiest time". "Required" changes are sometimes needed for the well being of our Association. These changes need to be well thought out, budget neutral, and result in the orderly growth of our overall Association.

Message from the Editor

Karen Blake

Many thanks to Hana Baker…

Hana Baker and John Harris have both been instrumental in keeping our website up, running and secure. With Hana's relocating out of our area, the Executive Committee has restructured the Newsletter and Website, pulling both responsibilities under the Editor's position.

We are currently working with a web designer to revamp the website. As we transition into our new team, I have reached out to several people in the geologic community to help support and maintain the website and to improve the newsletter:

Tim Stephenson will be our Web Coordinator / System Administrator.

Pam Ceccarelli will help out, both the newsletter and website, with lease sales announcements, as they become available.

Greg Cavette has agreed to be the Coastal Ad-hoc Reporter.

These are the names I got from around the water cooler. Now to reach out to those who drink at a different watering hole:

If you are a contact person at a college and can forward on scholarship information and job leads, please do.

If you are in a position that receives regulatory notices that affect our industry, please forward this on.

If you have a technical article you would like to feature in the newsletter, please forward this on.

Passing the knowledge on . . .let us post it and/or print it.

Subsurface Characterization of Natural-Gas Producing Structures in the Suisun Bay Sub-Basin, Western Sacramento Delta, Northern California

Part 1: Overview of the thrust system, and details on Los Medanos, Ryer Island and Suisun Bay gas fields

By Scott T. Hector, Paul Graham Drilling and Jeffrey R. Unruh, William Lettis and Associates

Editor's Note: This paper is a shortened version of a Final Technical Report submitted to the U.S. Geological Survey's National Earthquake Hazards Reduction Program in 1999. It has been split into three parts to fit within the limited space of the newsletter: Part 1, Overview of the Thrust System and Descriptions of Major Fields; Part 2, Descriptions of Minor Fields in the Basin; and Part 3, Discussions of Geological Models of the Sub-Basin. Though small in area, the Suisun Bay sub-basin of the Sacramento Basin has been a very prolific natural gas producing area, making over 350 Bcf of natural gas to date.

INTRODUCTION

The Suisun Bay sub-basin of the Sacramento-San Joaquin Delta region is located just east of San Francisco Bay and straddles the Sacramento River. The area is roughly 200 square miles in size, and is bordered by the city of Concord and Mt.Diablo to the south, the city of Cordelia and the western edge of the Suisun Bay to the west, the city of Fairfield and the adjacent Potrero Hills to the north, and the Kirby Hills and the city of Pittsburg to the east. The Suisun Bay sub-basin is structurally bounded on the west by the dextral (right-lateral) Concord-Green Valley fault system, and on the east by the dextral Pittsburg-Kirby Hills fault zone. Based on the analysis of drill hole and seismic reflection data, we interpret that the geologic structure between these two major strike-slip fault systems is characterized by a series of east-west to WNW-ESE-trending anticlines, most of which coincide with developed gas fields (see Figs. 1,2).

In total, the Suisun Bay sub-basin has produced more that 350 Bcf of natural gas. Almost all production occurs in structural traps. From south to north, the major fields include: the Los Medanos Anticlinorium (48 Bcf produced and proven gas reserves, including The adjacent Concord gas field structure); Roe Island and Ryer Island anticlines (142 Bcf); the Honker-Van Sickle anticlinorium (22 Bcf); the Suisun-Grizzly Island anticline or anticlinorium (91 Bcf); and the Potrero Hills anticline (non-commercial at 0.022 Bcf). In addition, the Kirby Hills gas field (58 Bcf) forms a significant gas field on a group of localized topographic and subsurface highs along the Kirby Hills Fault at the eastern boundary of the Sub-Basin. Drill hole data and seismic reflection profiles confirm that several of the anticlines in the western Delta region are underlain by blind thrust faults, indicating that they have formed as fault-bend or fault-propagation folds.

In this first part of a three-part paper, we describe the tectonic setting of the Suisun Bay sub-basin, our mapping approach, and our interpretation of the structure of the Los Medanos hills, Roe Island, Ryer Island, and Grizzly Island gas fields. The focus of this paper is on the subsurface characterization and origin of the fold structures, and does not describe the gas fields in detail.

Regional Tectonic Setting

The Suisun Bay sub-basin lies at the northern end of a belt of late Cenozoic contractional structures that can be mapped continuously for about 60 km north of the Diablo Range and Livermore Valley (Figure 1). South of the Suisun Bay sub-basin, the contractional belt is associated with an area of high, youthful topography that includes the 1173-m-high peak of Mt. Diablo. Following Unruh and Sawyer (1997), we refer to this group of contractional structures as the Mt. Diablo fold-and-thrust belt.

The structures in the Mt. Diablo fold-and-thrust belt generally trend west-northwest, oblique to the major dextral faults of the eastern San Andreas system, and they exhibit a well-defined right-stepping, en echelon geometry characteristic of dextral wrench tectonics (Figure 1). Unruh and Sawyer (1995; 1997) proposed that regional crustal shortening in the Mt. Diablo fold-and-thrust belt is "transpressional" in nature, and driven primarily by a restraining left-stepover or transfer of dextral slip from the Greenville fault southeast of Mt. Diablo to the Concord fault northwest of Mt. Diablo. Based on the orientation of the fold-and-thrust structures and their spatial association with strike-slip faults, we interpret that shortening in the western Delta region primarily is driven by distributed northwest-directed dextral shear between the Concord-Green Valley fault system on the west and the Pittsburg-Kirby Hills fault zone on the east.

Subsurface Mapping

To assess the geologic structure in this region, we prepared structure contour maps on the top of the Eocene-aged Domengine sandstone at a relatively small scale for the entire Suisun Bay sub-basin (Fig.2) and at larger scales for the individual gas fields. In developing our interpretations, we acknowledge significant previous contributions to understanding the structure of this region by Hoffman (1992), MacKevett (1992), and the Division of Oil and Gas (1982). Mapped by a combination of well log data and 2D seismic data, our maps were the primary method we used to discern the general shape of the Suisun Bay Sub-Basin. The Domengine sandstone is a laterally extensive stratigraphic horizon that is relatively easy to identify on electric logs. The Domengine lies stratigraphically below the conformably overlying Nortonville shale and the underlying Capay shale, which are noted where applicable on cross-sections in this report (detailed descriptions of these Eocene units are provided by MacKevett, 1992). The Domengine is by far the most prolific gas-producing unit in the Western Delta Region. Other units that produce are Eocene (Nortonville, Suisun Sands), Paleocene (Wagenet) and Upper Cretaceous (Winters or Forbes) in age.

The following sections discuss structures of the Suisun Bay sub-basin associated with individual gas fields.

Los Medanos Hills Anticlinorium

The Los Medanos Hills anticlinorium underlies the low hills north of the town of Clayton and east of the town of Concord (Figure 2) (Hoffman, 1992). The anticlinorium either plunges steeply to the northwest and southeast, or it is truncated at both margins by northeast-striking high-angle faults (Hoffman, 1992). Based on detailed analysis of the drill hole data, Hoffman (1992) interpreted that the Los Medanos Hills anticlinorium consists of three distinct folds or fold structures, segmented by northeast-striking high-angle faults that form structural boundaries of individual gas fields. From southeast to northwest, these structures include the Mulligan Pass (0.1 Bcf gas production), Willow Pass (6.4 Bcf) and Los Medanos (38 Bcf) anticlines (Hoffman, 1992). The crest of each structure is cut by a somewhat different pattern of closely-spaced thrust and reverse faults. We interpret these folds to be a single anticline or anticlinorium because they lie along a common trend,

have similar southwest-vergent geometry, and exhibit roughly similar amounts of structural relief. Total northwest-southeast length of the Los Medanos anticlinorium is approximately 10 km, and total northeast-southwest width of the structure is approximately 4.5 km (Figure 2).

Wells drilled to the west of the Los Medanos Hills anticlinorium penetrated a series of lower amplitude folds called the Concord anticline and the City of Concord anticline (Hoffman, 1992). The folds are associated with low hills southwest of the Los Medanos hills. These structures are parallel to the Los Medanos trend, and as they approach the Concord strike-slip fault they either die out or are truncated by the fault (Figure 2).

Gas exploration wells document uplift, folding and local repetition of the Eocene Domengine sandstone by thrust faulting beneath the Los Medanos Hills anticlinorium and folds to the southwest (Hoffman, 1992). Minimum structural relief on the Domengine sandstone across the main antiformal axis is approximately 1400 m. Structural relief on the Domengine sandstone across the smaller Concord and City of Concord anticlines to the west is approximately 600 m or less. Based on line-length restoration of the Domengine sandstone in Hoffman's cross-sections, total post-Eocene horizontal shortening across the Los Medanos Hills anticlinorium and folds in the Concord area is about 2.2 km to 2.5 km. Based on analysis of drill hole data, Hoffman (1992) inferred that the Pleistocene Montezuma Formation is involved in the folding of the Los Medanos Hills anticlinorium, implying that at least some growth of the fold occurred during the Quaternary.

Roe Island and Ryer Island Anticlines

Roe Island and Ryer Island are located within the Sacramento River channel south of Grizzly Bay and east of the Carquinez strait (Figures 2 and 3). The islands are associated with two significant structures (Roe and Ryer, respectively) and one gas field (Ryer Island, 138 Bcf produced to date) formed by northwest-trending anticlinal traps (Division of Oil and Gas, 1982). Crane (1995a) interpreted that the fold structures are underlain by northeast-dipping thrust faults on his compilation maps.

The Roe Island structure is associated with an asymmetric, southwest-vergent anticline, herein referred to as the Roe Island anticline, that is at least 4 km long (Figure 3) and may be up to 8 km long if the fold axis extends as far northwest as the Green Valley fault (Figure 2). Minimum structural relief across the fold is about 1740 m, but may be as great as 2450 m (8000 ft).

We interpret that the Ryer Island gas field north of Roe Island is associated with two different contractional structures. We infer that the structural high associated with the northwest end of Ryer Island is a small, 1-km-wide antiformal fold bounded on both the northeast and southwest margins by inwardly dipping thrust or reverse faults. This fold or "pop-up" block is developed on the back limb of the much larger Roe anticline (Figure 4). We estimate that total relief on the Domengine sandstone across the pop-up block is about 100 m or less. The thrust faults bounding the pop-up block appear to converge at relatively shallow depths (i.e., 2.0 seconds two-way travel time or less), indicating that the "pop-up" structure is not deeply rooted.

In contrast to the "pop-up" structure that forms the northwest end of the Ryer Island gas field; proprietary Chevron seismic lines that cross the southeastern part of the field image a 2-km-wide southwest-vergent anticline that exhibits a minimum of about 800 m (2612 ft). Although the axis of the Ryer Island anticline is approximately coincident with the axis of the pop-up block to the northwest (Figure 4), the two structures have different geometries, and based on the difference in structural relief along the northwest-southeast axis of the Ryer Island gas field, the structures have accommodated different amounts of total shortening.

As shown on the structure contour map (Figure 3), we interpret that the Roe Island anticline is separated from the northwest end of the Ryer Island anticline by a northeast striking, high-angle tear fault or lateral ramp.

Grizzly Island Anticlinorium (Suisun Bay Gas field)

The Suisun Bay and Grizzly Island structures are associated with a faulted, northwest-trending anticlinorium or anticlinal fold trend (Division of Oil and Gas, 1982). The axis of the structure lies along the southern end of Grizzly Island (Figure 2). For simplicity, we refer to the structure as the Grizzly Island anticlinorium. Based on analysis and mapping of well data, minimum length of the anticlinorium is about 10 km and the minimum width is about 4 km (Figure 6). Maximum structural relief on the Eocene Domengine sandstone across the anticline is about 580 m (1900 ft), significantly less than the structural relief across the Los Medanos Hills and Roe Island anticlines to the southwest (Figure 2).

The Grizzly Island anticlinorium is asymmetric and vergent to the north-northeast. Based on construction of a correlated cross-section through several wells across the eastern end of the structure, however, we believe that a south- or southeast-dipping thrust fault is present beneath the fold (Figure 7). The correlated

well data in the cross-section support the asymmetric geometry of the fold visible in the seismic data, and dipmeter data from two wells ("Suisun Community #16", "Fontana Farms #7") reveal abrupt changes in bedding dip at depth similar to those imaged by the seismic data, consistent with the presence of a thrust fault beneath the fold (Figure 7). In our interpretation of the Fontana Farms #7 well, the thrust fault displaces the Domengine sandstone about 200 m and total slip on the thrust fault at depth is probably greater.

Available well data suggest that the anticlinorium is divided or segmented by a series of faults that are oblique to the northwest trend of the structure (Figure 6). The Division of Oil and Gas (1982) also adopted this interpretation in their structure contour map of the field. The primary evidence for these faults is a series of abrupt changes in the depth of the Domengine sandstone between closely spaced wells that are difficult to depict by drawing smooth, unfaulted structure contours through the well data. We interpret that the axis of the anticlinorium is offset by a series of high-angle faults that consistently displace the Domengine sandstone down to the east (Figure 6). In our interpretation, we show these faults as splaying into a northwest-striking thrust fault or faults that underlie the Grizzly Island anticlinorium, but the well data are too sparse to demonstrate this compellingly. An alternative interpretation that would satisfy the well data is that there are a series of older, approximately north-south-striking normal faults that consistently offset the Domengine sandstone down to the east, and which were subsequently folded during growth of the Grizzly Island anticlinorium.

Closing

This concludes the first of three segments of this report. We have discussed the general structural framework of the Suisun Sub-Basin and discussed the three major fields in the area: Los Medanos, Ryer Island and Suisun Bay. The "minor" gas fields of the Suisun Basin (Honker, Van Sickle, Kirby Hills and Potrero Hills) will be discussed in the next issue of the Pacific Section AAPG newsletter.

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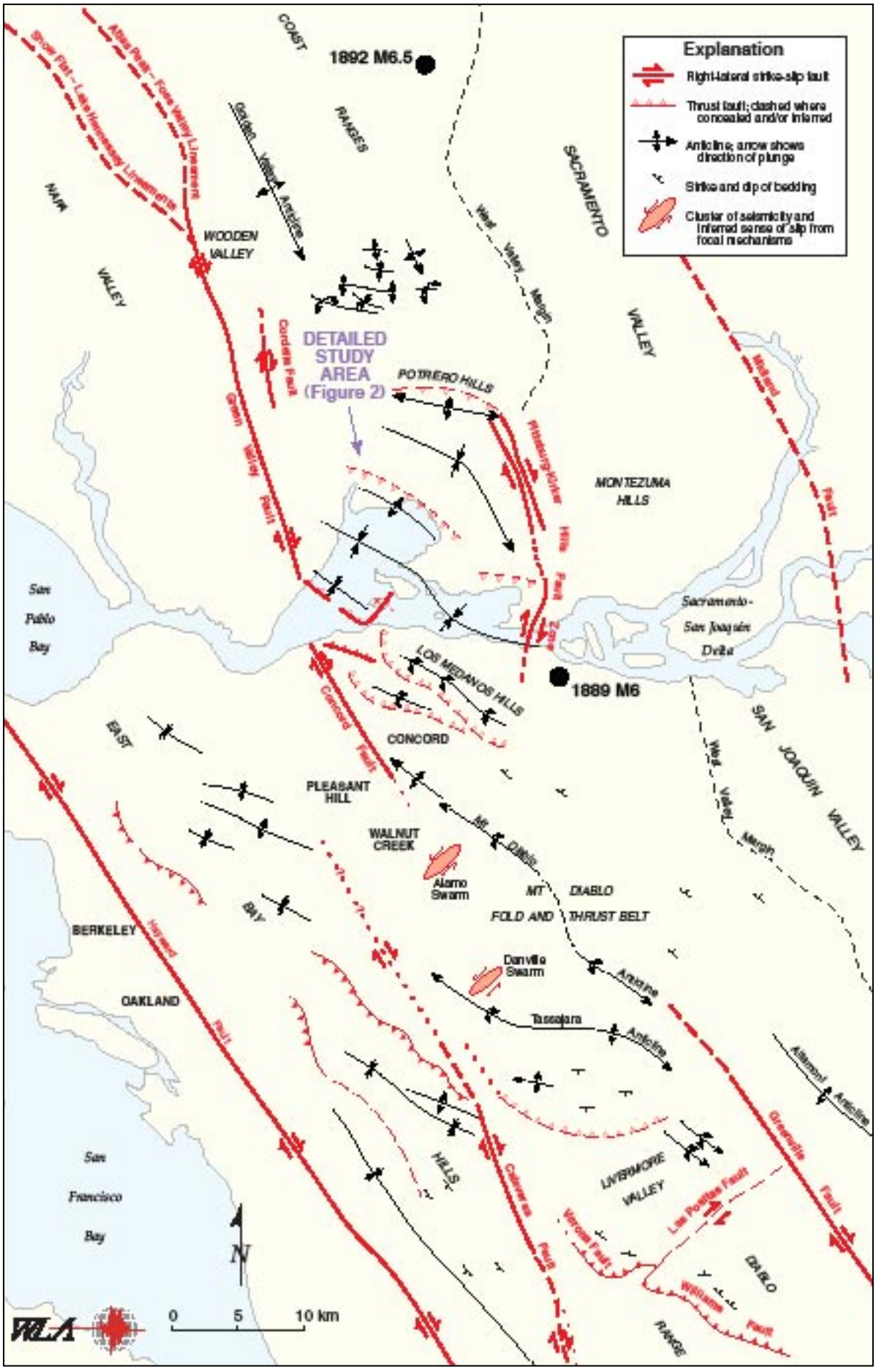


Figure 1. Generalized tectonic map of the eastern San Francisco Bay area, northern California. The box shows the location of the western Sacramento-San Joaquin Delta study region.

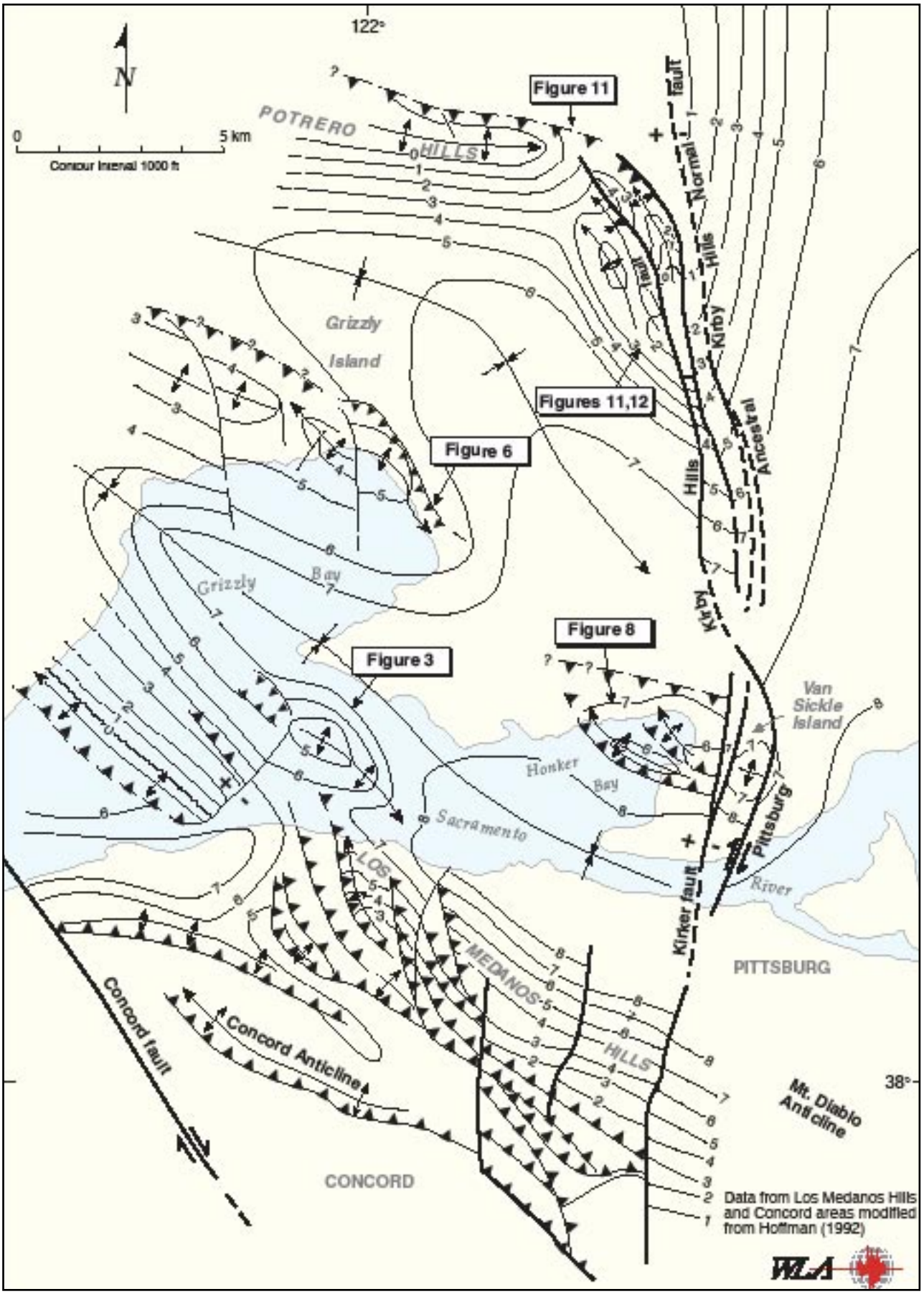
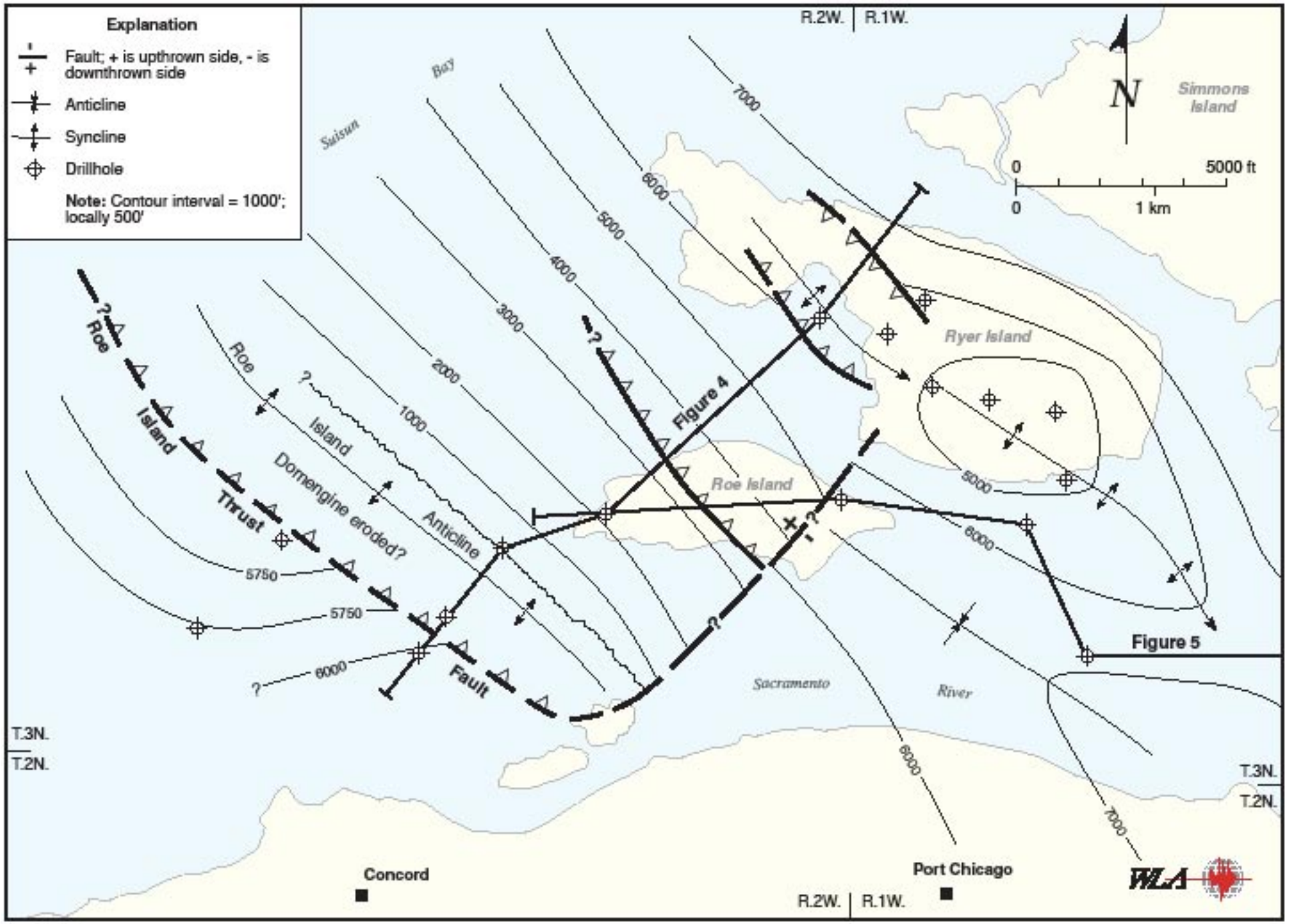


Figure 2. Structure contour map on the top of the Eocene Domengine sandstone in the western Delta study area. Cuntour interval is 1000 feet. Data from the Los Medanos Hills and Concord areas are modified from Hoffman (1992). See indicated figures for detailed maps of individual gas fields.



Firgure 3. Structure contour map on the top of the Eocene Domengine sandstone, Roe Island and Ryer Island gas fields (see Figure 2 for location in the western Delta study region.

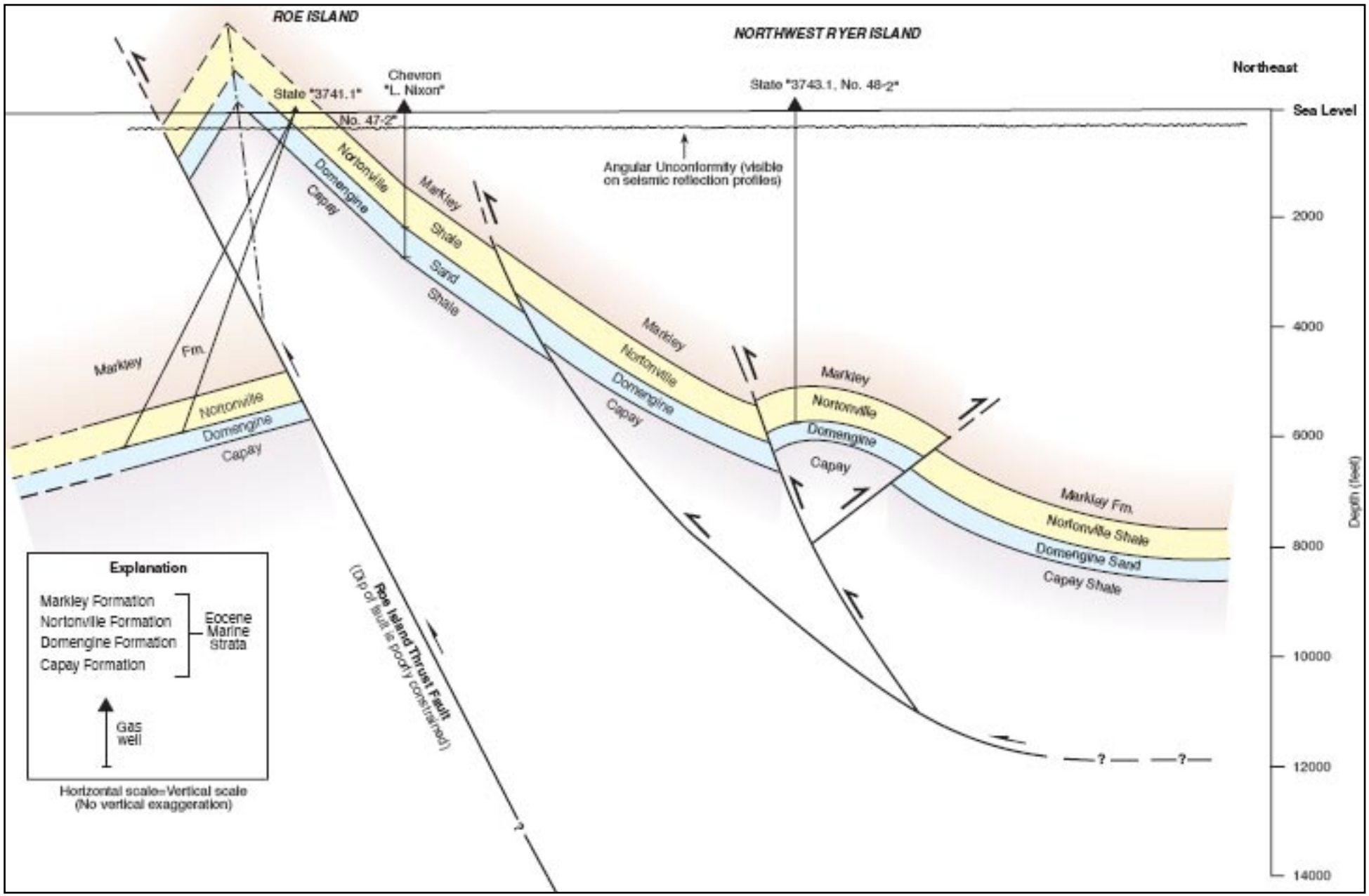


Figure 4. North-south cross-secton across the Roe Island and Ryer Island gas fields showing the geometry of the south-vergent Roe Island anticline (see Figure 3 for location of section line.) The locations of the Roe Island thrust fault and shallow thrust faults beneath northwest Ryer Island are inferred primarily from analysis of proprietary seismic reflection profiles.

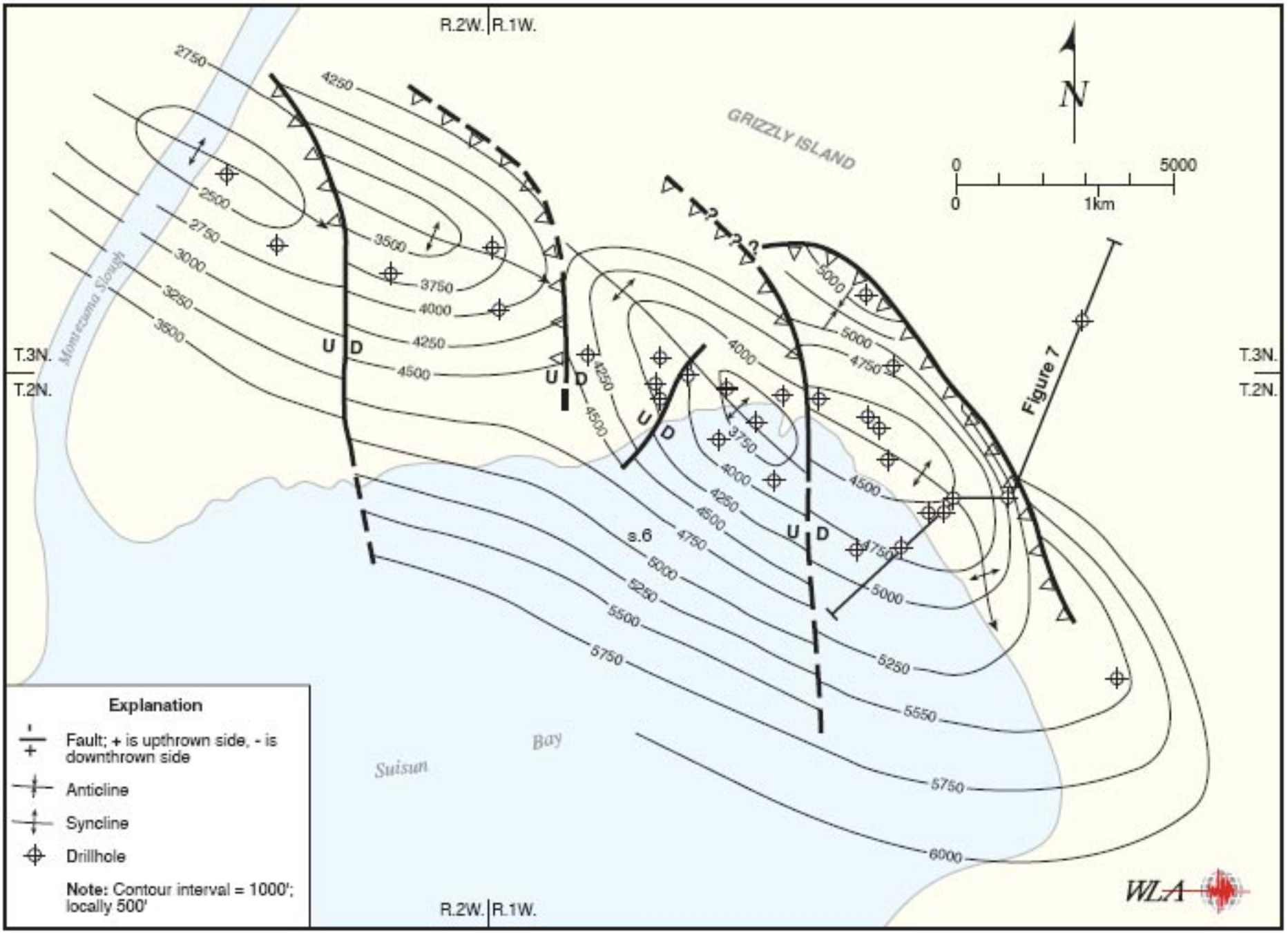


Figure 6. Structure contour map on the top of the Eocene Domengine sandstone, Suisun Bay and Grizzly Island gas fields, showing interpreted structure of the Grizzly Island anticlinorium (see Figure 2 for location in the western Delta study region).

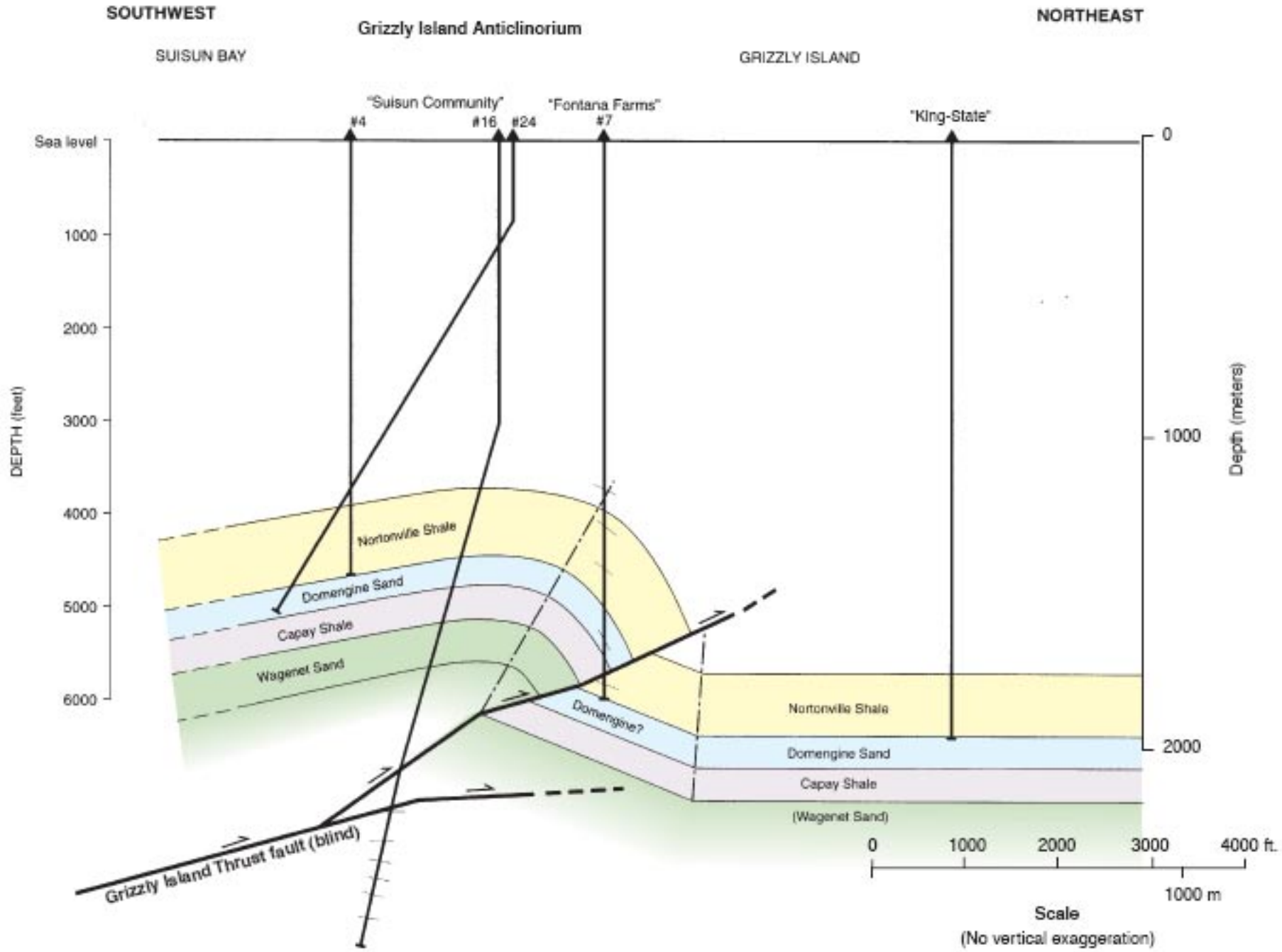


Figure 7. Northeast-southwest cross-section across the Suisun Bay and Grizzly Island gas fields showing the north-vergent Grizzly Island anticlinorim and underlying south-dipping Grizzly Island thrust fault (see Figure 6 for location of section line).

The Executive Committee has approved the following list of Honors and Awards for 2007. The awards will be presented at the annual meeting in Long Beach.

Sidney Powers Memorial Award
Arnold H. Bouma

Michel T. Halbouty Outstanding Leadership Award
John J. Amoruso

Honorary Member Award
Edward D. Dolly
Marlan W. Downey
Daniel L. Smith

Outstanding Explorer Award
Dan B. Steward

Distinguished Service Award
Adekunle A. Adesida
Alfredo E. Guzman
Andrew Hurst
John C. Lorenz
Erik P. Mason
Valary L. Schulz

Grover E. Murray Memorial Distinguished Educator Award
Janok Bhattacharya
A. Eugene Fritsche
Stephan A. Graham

Special Award
Richard D. Fritz
Marcus Milling

Public Service Award
Peter T. Flawn
Lee C. Gerhard
Edward M. Warner

Pioneer Award
W. Herbert Hunt

Publication Awards

Wallace E. Pratt Memorial Award
Shankar Mitra,
Gerardo Correa Figueroa
Jesus Hernandez Garcia
Antonio Murillo Alvarado

Robert H. Dott, Sr. Memorial Award
Amos Salvador

J. C. "Cam" Sproule Memorial Award
No Sproule Award this year

George C. Matson Award
Steven H. Brachman

Jules Braunstein Memorial Award
George W. Shurr
Thomas Haggar
Sarah A. Chadima

Geosciences in the Media Award
Michael J. Economides

CGS
Stratigraphic and Structural Controls on Fracture Distribution: Examples from California's Coastal Basins
Wine and Geology California Central Coast

LABGS
Borderland Rift Basement Tectonics and Geology of Santa Catalina Island
Geology of the Palos Verdes Peninsula
Santa Monica Mt Outcrops - Deep Production from the LA Basin
Urban Oil Field Geology - Los Angeles Basin

PS-AAPG
Heavy Oil: Production, Core and Outcrops from the East Flank of the San Joaquin Basin
Heavy Oil: "Oil On Their Shoes" - Famous and Little Known Oil Seeps of LA and Ventura Counties
THUMS Islands Tour

SEPM
Baja California –Volcanic Arcs and Related Sedimentation
Sand Injectites in the western San Joaquin Valley
Santa Cruz Island -- Sedimentation and deformation of a Tertiary continental margin
Sedimentology and Facies Architecture of Channelized Slope System: Capistrano Formation, San Clemente, Southern California
Tectonic Controls on Facies Distribution and Stacking Patterns, Ridge Basin, southern California

SJGS
Late Cenozoic Structural Framework and Stratigraphic Evidence of the Inception of the Colorado River Below Grand Canyon
Searching for the Mojave-Sonora Megashear in Northeastern Mexico
Synchronous extension and strike-slip faulting from the Sierra Nevada to the Colorado Plateau:
A tour of exposed analogues to petroleum-bearing basins and structures
The San Andreas Fault Observatory at Depth (SAFOD) and a tour of the San Andreas Fault System

Don Lowe and Steve Graham for many years worked on turbidite systems separately and from different perspectives before realizing that combining forces could greatly expand their research scope and productivity.

Donald R. Lowe

While a professor at Lousiana State University for nearly two decades, Don established a reputation as a process sedimentologist, and through his publications illuminated the mechanics and depositional products of high-density sediment-gravity flows.

In the meantime, Steve Graham worked in the petroleum industry with Exxon Production Research Company and Chevron Corporation, gaining experience in interpreting deep-water deposits at formation to basin scale from seismic and other subsurface data. He continued basic and applied research on deep-water deposits, especially in California basins, after joining the Stanford University faculty in 1980.

Stephan Graham

Soon after Don made the move from LSU to Stanford in 1988, the pair envisioned a partnership that would provide their students with a graduate education in clastic sedimentary geology in a continuum from grain scale to basin scale, using outcrop and subsurface methods and data sets, and in the process greatly expand their research on deep-water depositional systems.

In 1991 they formed an industrial consortium, the Stanford Program on Deep-Water Depositional Systems (SPODDS), to underwrite that education and research program and to enhance university-industry exchange. SPODDS, now in its 15th year, underwrites diverse student dissertation research projects on five continents. Building on those years of experience, especially in California turbidite systems, and motivated by the SPODDS objective of enhanced university-industry interaction, Don put together an atlas-format field guide for the AAPG Hedberg Field Conference in 2000 (jointly published in modified form by AAPG and Pacific Section AAPG in 2004). This field guide creatively combined a suite of excellent but diverse and unrelated California outcrops in a journey down a virtual submarine canyon-fan system. Together, Don and Steve hosted the Hedberg Conference and found the field trip concept sufficiently well received that they subsequently co-led the field trip as in in-house trip for various companies. In 2006, they modified the trip as an offering in the AAPG Field Seminar series.

Core Workshop:
Deep-Water Reservoirs of California
From Core to Reservoir Characterization, Modeling, and Production

This 1-day workshop enables participants to examine continuous cores from some of California's most prolific deep-water reservoirs. Each presenter will use a poster format to report on the key aspects of their specific cored reservoir. This will include the general stratigraphic and depositional framework, as well as a review of some of the key field and reservoir parameters. Course notes will provide summaries and expanded abstracts for each of the cores.

The informal setting will include an introductory discussion of deep-water depositional processes, led by Don Lowe of Stanford University, and examples of the diagnostic sedimentary structures and stratigraphic associations in the cores. The format provides the opportunity for detailed individual examinations, and small group discussions led by the authors that will highlight field characteristics, depositional processes and environment, reservoir characterization, and approaches for reservoir modeling.

Reservoir examples include:

- Midway Sunset Field - Miocene Potter Sandstone – one core from feeder canyon facies and second core from prograding turbidite fan complex of a heavy oil deposit
- Midway Sunset Field - Miocene Webster Sandstone – petrophysical model of heavy oil turbidite sandstone
- Elk Hills Field – Miocene Stevens Sandstone
- Wilmington Field – Miocene Ranger Sandstone
- Alan Reed diatomite core (Chevron)?
- Venado outcrop core (Don Lowe) - Core to outcrop comparison
- Others

Sedimentology and Facies Architecture of Channelized Slope System:
Capistrano Formation, San Clemente, Southern California

Outcrops of the Capistrano Formation located in the vicinity of San Clemente State Beach and San Clemente City Park provide excellent exposures of deep-water channels that were deposited in a slope setting. The Capistrano Formation is late Miocene to Pliocene in age and unconformably overlies diatomaceous shales and mudstones of the middle to late Miocene Monterey Formation. Analog data for many seismically resolved confined-channel complexes comes from outcrop studies that provide insight into the lithofacies distribution and architectural features at the bed, bed set, channel, and channel complex scale. The Capistrano Formation is a sand-dominated system that is about 20 m thick and 1.3 km wide and serves as a model for confined channels that are typically represented seismically by a single cycle. The Capistrano is made up of laterally amalgamated channels that exhibit a change in net to gross ratio, facies preservation, and bed architecture from the channel margin to axis. Channel-margin facies is low net to gross (<50% net), non-amalgamated, thin-bedded, and dominated by a low-concentration of turbidites. In contrast, the channel-axis facies is high net to gross (>90%), thick bedded, amalgamated, and dominated by a high-concentration of sandy turbidites and gravel-rich tract ion deposits. The channel-margin facies is 200-300 m wide, whereas the channel-axis facies is 600-700 m wide. The Capistrano Formation also displays a well-developed hierarchy of architectural units consisting of channel stories, channel-fills, channel complexes, and channel complex sets.

Is there interest in a Mexican Riviera cruise the week (April 8-15) after the AAPG convention in Long Beach?

This would not be associated with the AAPG convention just strictly vacation fun. Carnival Cruise Line sails out of Long Beach. I have contacted them regarding the availability of the date and pricing. For those interested we can book as a group to secure the date at discounted group fares.

I recently went on this cruise but only made it to Cabo San Lucas after the ship itinerary was changed because of a hurricane. Other ports are Mazatlan and Puerto Vallarta. As they advertise I had a million moments of fun on this cruise. The ship, Carnival Pride, is one of their newest ships. Go to Carnival Pride cruises to Mexican Riviera website for more information. I'm calling our group Well Planners, Family and Friends to include geologists and engineers. Again this is not associated with the AAPG convention but designed for fun. An excellent guidebook that I used on my trip is AAPG Memoir 47, the Gulf and Peninsular Province of the Californias.

Let me know if you are interested. My contact is Lakeisha Dixon, Group Email Planners, 1-866-721-3225 Ext.24112, Ldixon@carnival.com, The Fun Ships.

John Randall
jrandall@plainsxp.com

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From the Federal Register:
DOI: The Minerals Management Service has issued a request for comment on the 2007 – 2012 Oil and Gas Leasing Program proposal. The proposal outlines a total of 21 outer-continental shelf lease sales in Alaska, the Gulf of Mexico and off the Atlantic Coast. The proposal may be downloaded and viewed at http://www.mms.gov. Send comments electronically to: http://www.mms.gov/5-year/2007-2012main.htm no later than November 24, 2006. For further information contact Renee Orr at (703) 787-1215. [Federal Register: August 25, 2006 (Volume 71, Number 165)].

Minerals Management Service

INDUSTRY SEMINAR
November 16, 2006
9:00 am to 12:00 pm

770 Paseo Camarillo, Camarillo, CA 93010
2nd Floor Conference Room

The Minerals Management Service will conduct a seminar in the Pacific OCS Region to provide training and inform participants on implementing recent regulatory changes. We will also discuss certain on-going and future changes to MMS regulatory processes and procedures.

Welcome/Introduction	Regional Manager
Cost Recovery *Pay.Gov*	Elverlene Williams, Mineral Leasing Specialist
OCS Connect *E-Gov Initiative - Electronic Submissions*	Frederick White, Social Scientist
Forms for Well Operations *Applications for Permit to Drill or Modify, EORs and WARs*	Shannon Shaw, Petroleum Engineer/Inspector
Forms for Adjudication *Record -Title Assignments, Relinquishments*	Elverlene Williams, Mineral Leasing Specialist

Closing Remarks

Please contact Elverlene Williams with the number of attendees from your organization at (805) 389-7837 or elverlene.williams@mms.gov by COB November 11, 2006.

AAPG Distinguished Lecture Program
Western Region

Steven L. Bachtel — ConocoPhillips Co.
February 26-March 9, 2007 — Houston, Texas

"Seismic Stratigraphy of the Miocene-Pliocene Segitiga Platform, East Natuna Sea Indonesia: The Origin, Growth, and Demise of an Isolated Carbonate Platform"

Timothy H. Dixon — University of Miami
February 19-March 2, 2007 — Florida

#1 -- "Hurricane Katrina and New Orleans: Subsidence Measurements from Space"

#2 -- "Crustal Deformation Near the San Andreas Fault: Estimating Elastic Parameters of the Upper Crust with Space Geodesy"

Jacob B. Lowenstern — USGS
February 19-March 2, 2007 — Menlo Park, California

"Intrusion, Deformation and Degassing at the Yellowstone Caldera"

Marian J. Warren — Encana
February 12-23, 2007 — Calgary, Alberta, Canada

#1 -- "An Exploration Case History: How We Made a High-Impact Gas Discovery in a Maturing Basin (Western Canada)"

#2 -- "Extensional Faulting, Paleodrainage Patterns and Impact on Hydrocarbon Reservoir Quality and Distribution During Foreland Basin Subsidence: A Case Study from the Cretaceous of Alberta"

Visit the AAPG website to request a date:
http://www.aapg.org/education/dist_lect/domestic.cfm

Pacific Petroleum Geologist

Membership Form

Pacific Section AAPG Foundation

The Pacific Section AAPG Foundation conducts the charitable and educational business of the Pacific Section AAPG and is a 501(c)(3) corporation. The foundation houses various tax-exempt funds that serve the West Coast geological community and the general public through educational and informational programs.

Bob Hacker Publication Fund

Named for a prominent West Coast geologist and former president of the Pacific Section, the Bob Hacker fund is used to help underwrite Pacific Section AAPG publications.

Martin Van Couvering Fund

This fund assists and encourages student attendance and participation at annual Pacific Section meetings and field trips. At the request of the Pacific Section, deserving students are selected by faculty at universities local to the annual convention. Students receive funding for convention registration and costs.

Dibblee Map Foundation

This fund directly supports the Dibblee Geology Center in carrying on the lifelong work of Thomas W. Dibblee. Donations directly support publication of his maps.

California Well Sample Repository

The California Well Sample Repository is located on the campus of California State University, Bakersfield. It houses core samples, cuttings samples and well files from locations all over the State of California. Donations directly support facility operations.

John E. Kilkenny Memorial Scholarship Fund

Donations to this scholarship fund directly support the national AAPG's named grant program. the Kilkenny Grant supports a graduate student working on a West Coast geology project.

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P.O. Box 1072
Bakersfield, CA 93302

Alaska Geological Society

www.alaskageology.org

P. O. Box 101288
Anchorage, AK 99510

Contact: Robert Blodgett
786-7416

Luncheon meetings are held monthly September through May, usually on the third Thursday of the month, at the Anchorage Hilton (500 W. 3rd Avenue) from 11:30 a.m. to 1:00 p.m. The cost is $17 (members with reservations) or $20 (members without reservations and nonmembers). For reservations, call the AGS reservation voice mail at 907-646-7106 or contact **Edna Beuhler** at edna.beuhler@encana.com by noon on Monday before the meeting.

2006 - 2007 Officers - TBA

Nov. 21 - Kristine Crossen, "Bering Glacier"
Dec. 7 - Laurel Burns, " Airborne Geophysical Dat along the Alaska Highway Corridor, What is it telling us?"

Coast Geological Society

www.coastgeologicalsociety.org

P. O. Box 3055
Ventura, CA 93006

Contact: Shaun Simon
805.495.2197

Dinner meetings are held monthly September through June, usually on the third Tuesday of the month, at the Veterans of Foreign Wars Hall at 3801 Market Street in Ventura. Social hour starts at 6:00 p.m., dinner is served at 7:00 p.m., and the talk starts at 8:00 p.m. The cost of dinner is $15 (with reservations), $18 (without reservations), or $8 (students and K-12 teachers); the talk is free. For reservations, contact **Dave Brown** at 805.653.7975 or make reservations online at www.coastgeologicalsociety.org. Reservations should be made by 4:00 p.m. on Friday before the meeting.

2006 - 2007 Officers:

President:	John Minch	805.682-4711, ext 137	president@coastgeologicalsociety.org
Past-President:	Shaun Simon	805.495.2197	ppresident@coastgeologicalsociety.org
Vice President:	Mike Phipps	805.495.2197	vpresident@coastgeologicalsociety.org
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Assistant Webmaster:	Hal B. Myers	805.672.0491	awebmaster@coastgeologicalsociety.org
Webmaster:	Geoff Faneros	805.320.3973	webmaster@coastgeologicalsociety.org

Nov. 21st: Harold Irby, "International Oil Supply and Demand"

Los Angeles Basin Geological Society

www.labgs.org

515 So. Flower Street, Ste 4800
Los Angeles, CA 90071

Contact: Jon Kuespert
213.225.5900 x224

Luncheon meetings are held monthly September through November and January through June, usually on the third or fourth Thursday of the month, in the Monarch Room at The Grande at Willow Street Conference Centre (4101 E. Willow Street) in Long Beach. Lunch is served at 11:30 a.m., and the talk starts at 12:15 p.m. The cost is $20 (with reservations), $25 (without reservations), or $5 (students). Reservations can be made online at www.labgs.org or by contacting **Ivan Aburto** at iaburto@breitburn.com or 213-225-5900 ext. 234. Reservations should be made by Tuesday before the meeting.

2006 - 2007 Officers

President:	Jon Kuespert	213.225.5900	jkuespert@breitburn.com
Treasurer:	Steve Zigan	949.355.4467	szigan@eri-us.com
Secretary:	Ivan Aburto	213.225.5900	iaburto@breitburn.com

Nov. 16th: Kevin Grazier, "The Cassini/Huygens Mission to Saturn and Titan"

No December Meeting.

Northern California Geological Society
www.ncgeolsoc.org

9 Bramblewood Court
Danville, CA 94506-1130

Contact: David Bero
dbsquare@earthlink.net

Evening meetings are held monthly September through May, usually on the last Wednesday of the month, at the Masonic Center (9 Altarinda Road) in Orinda. Social hour starts at 6:30 p.m., and the talk starts at 7:00 p.m. (no dinner). The cost is $5. For reservations, contact **Dan Day** at 925-294-7530 (leave your name on the voice recorder any time before the meeting).

2006 - 2007 Officers

President:	David Bero	dbsquare@ earthlink.net
President Elect:	Bill Perkins	weperkins@comcast.net
Treasurer:	Phil Reed	philecreed@msn.com
Secretary:	Day Day	danday94@pacbell.net

Nov. 15th: Dylan Rood, " Movement along the eastern Sierra frontal fault: constraints from cosmogenic nuclide dating"

Northwest Energy Association
dlgellar@msn.com

P. O. Box 6679
Portland, OR 97228-6679

Contact: James Jackson
503-771-3887

Luncheon meetings are held monthly October through May, usually on the second Friday of the month, at the Multnomah Athletic Club (1849 SW. Salmon Street) in Portland. The meeting starts at 1:00 p.m. The cost is $15. For information or reservations, contact **Shelley Thomas** at 503-848-2947 or **Treck Cardwell** at 503-226-4211 ext. 4681.

2006 - 2007 Officers

President	Jamie Schick	(503) 948-7726

Remaining Officers: TBA

Sacramento Petroleum Association

P. O. Box 571
Sacramento, CA 95812-0571

Contact: Rick Blake
925-422-9910

Luncheon meetings are held monthly January through November, on the third Wednesday of the month at the Hungry Hunter Restaurant (450 Bercut Drive) in Sacramento. The meetings starts at noon. The cost is $16. For information or reservations, contact **Pam Ceccarelli** at 916-322-1110 or pceccare@consrv.ca.gov.

2006 - 2007 Officers

President:	Rick Blake	blake2@llnl.gov
Vice President:	Marc Brennen	marc.brennen@halliburton.com
Secretary/Treasurer/Editor	Pam Ceccarelli	Pam.Ceccarelli@conservation.ca.gov

San Joaquin Geological Society
www.sjgs.com

P. O. Box 1056
Bakersfield, CA 93302

Contact: Rob Negrini
rnegrini@csub.edu

Dinner meetings are held monthly October through June, usually on the second Tuesday of the month, at the American Legion Hall (2020 H Street) in Bakersfield. The icebreaker starts at 6:00 p.m., dinner is served at 7:00 p.m., and the talk starts at 8:00 p.m. The cost of dinner is $20 (with reservations) or $23 (without reservations); the talk is free. For reservations, contact **Tracey Fleming-Reese** at Tracey_Fleming-Reese@oxy.com or phone her at 661.763.6523.

2006 - 2007 Officers

President:	Bill Scanlan	wscanlan@bak.rr.com
President- Elect:	Dave Miner	dmminer@aeraenergy.com
Vice President:	Jonathan Lange	JLange@chevron.com
Secretary:	Tracey Fleming-Reese	tracey_fleming-reese@oxy.com
Treasurer:	Linda Specht	linda.specht@corelab.com
Past-President	Rob Negrini	rnegrini@csub.edu

Nov. 14th: Dr. James Boles, "Methan seepage along faults in the Santa Barbara coastal area, California: geologic and modern evidence"

Dec 12th: TBA

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