MISSISSIPPI GEOLOGICAL SOCIETY

VOLUME XLII NUMBER 1 SEPTEMBER 1993

PRESIDENT'S LETTER

As the Society begins a new year, we can look back on recent successes such as North Frisco City Field and Grayson Field with pride, knowing that some of our members had big parts in the success of these projects. These two fields alone have created many opportunities in their respective areas for others to seek equally successful projects.

If you do not already know our new officers, their names are listed at the front of the bulletin. Please make an effort to meet our officers, and if you have any questions or suggestions, do not hesitate to call one of us. Our Second Vice-President, Lars Johnson is working hard to get quality speakers for our luncheons. If you have any questions for speakers, give him a call at 977-5424.

This month's luncheon is September 14. In keeping up to date with the latest exploration techniques, our speaker for September, Susie Mastoris with Landmark Graphics, will speak on 3-D seismic. With the rise in 3-D seismic acquisition and the successes gained from its use (7 of 8 wells at North Frisco City Field were completed as producers after 3-D seismic was shot), I am sure everyone will be interested in this talk.

Our Fall Bar-B-Que will be held Thursday, September 23, 1993 from 4:30 p.m. until at the Reservoir Lodge. Make plans to attend.

Don't forget to renew your membership for 1993-1994. Dues can be paid at the September luncheon, the Fall Bar-B-Que or by mailing them to the MGS P.O. Box.

See you September 14!

3-D Workstation Technology: by: Susie Mastoris, Landmark Graphics Corporation, Houston, Texas

Examples of Recent Onshore and Offshore Successes

This presentation will cover examples of how 3-D seismic, combined with new interactive workstation techniques, pinpointed subtle stratigraphic plays which had been missed by conventional 2-D interpretations, and discovered new reserves in aging, offshore producing fields.

Onshore examples of a West Texas pinnacle reef and a Minnelusa sand dune play will show how the improved resolution of 3-D seismic, combined with workstation techniques such as color, flattening, 3-D autotrackers and amplitude extraction maps identified new prospects and follow-up locations to previously unexplained dry holes.

A case study of a faulted, complex area in the transition zone of the Louisiana Gulf Coast will show how oil and gas sand traps were identified using basic 3-D interpretation techniques. The techniques include a time slice, to illustrate the complexity of the fault pattern missed by 2-D seismic, the use of color, to enhance the bright spot amplitudes, and the combination of a 3-D autotracker and amplitude extraction to map the areal extent of each producing anomaly.

New 3-D visualization techniques such as clipping the 3-D seismic down to an autotracked horizon, will show how each of the bright spot anomalies are actually separated by individual faults, instead of being one continuous reservoir. 3-D representations of the salt dome, time slices and interpreted horizons will illustrate the complete picture of the producing traps.

An offshore, Gulf of Mexico example of a 36-year-old, declining field will show how 3-D technology revitalized a field close to abandonment. Up until 1987, all wells were based on poor quality 2-D seismic and well control. This resulted in more and more dry holes, further increasing the finding and developing costs.

With the advent of a new, high quality 3-D dataset, stacked pay zones, previously masked by out-of-plane events were revealed for the first time. The combination of the 3-D autotracker and amplitude extraction maps were used for well placement and defining the extent of each pay zone. 3-D visualization of the pay zones will show the amplitudes and their relationship to the complex fault pattern.

Statistics showing the dramatic turnaround in the success ratio of drilled wells and field production rates, will also be presented.

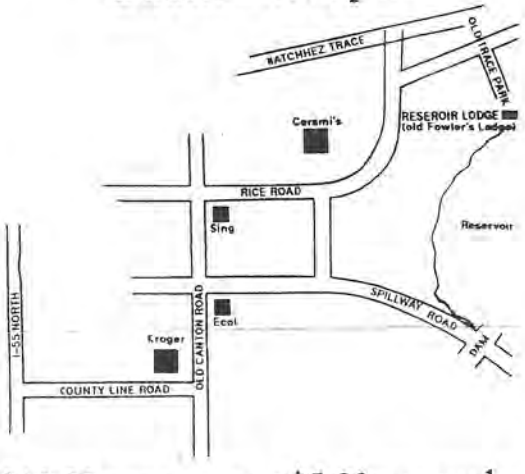
Engineering and Environmental Coordinating Committee

by STEVE JENNINGS

The Engineering and Environmental Coordinating Committee was created by MGS last spring to serve as a vehicle for increased awareness and knowledge for the Mississippi professionals interested in engineering and environmental geology. Similar, successful programs have been initiated by AAPG and sister societies such as the Houston Geological Society. The principal functions of this committee will be educational and as a supplement to the excellent program MGS already offers. There are many interesting technical subjects that could be included in a future program of speakers, seminars, and field demostrations. As committee chairman, I am currently developing plans for activities and soliciting ideas from MGS members. Please contact me (961-5205) if you are interested in helping to serve on this committee or just want to pass along your ideas.

FALL BBQ

Thursday, September 23
Reservoir Lodge
Festivities – 4:30 p.m.
Dinner – 6:00 p.m.



$10.00 per person • $5.00 per student

BUSINESS MEETING LUNCHEON SCHEDULE

FALL BBQ	January 11, 1994
SEPTEMBER 23, 1993	February 8, 1994
	March 8, 1994
September 14, 1993	April 12, 1994
October 12, 1993	May 10, 1994
November 9, 1993	
December 14, 1993	SPRING FLING – May, 1994

BUSINESS MEETING LUNCHEON

11:30 A.M. SEPTEMBER 14, 1993
Capitol City Petroleum Club, Smackover Room
SUSIE MASTORIS - Speaker
Landmark Graphics Corporation – Houston, TX

Mississippi Geological Society – 1993-1994

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Roger Bergeron, Secretary (992-1104) ..... Location Sample Service
Stanley King, Past President (352-4458) ..... Independent

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DELEGATES

AAGP ..... Gerald Kinsley (94)
AAPG ..... Dave Cate (93)
AAPG ..... Rick Ericksen (95)
AAPG ..... Alternate - Dave Chastain (95)

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Oleta R. Harrell*	Frederic F. Mellen*	Henry Toler*
Dudley J. Hughes	Maurice E. Miesse*	*Deceased

MISSISSIPPI GEOLOGICAL SOCIETY TREASURER'S REPORT
OPERATING YEAR ENDING MAY 31, 1993

REVENUES

Membership Dues	$ 4,920.00
Oil In The Deep South (Book Sales)	6,753.17
Luncheon Receipts	3,805.00
Bulletin Advertising	1,640.00
Earth Enterprises (Pub. Sales)	563.00
Spring Fling '92 Contributions	200.00
Spring Fling '93 Contributions	600.00
Spring Fling '93 Door Receipts	740.00
Sequence STRAT. Field Trip	235.00
Christmas Party Door Receipts	545.00
Fall BBQ Contributions	600.00
Fall BBQ Door Receipts	630.00
Chevron (Knox Seminar Copies)	17.90
TOTAL	$21,249.07

Dudley Hughes (Check for Publishing Book)	$14,000.00
University Press (Check to Publish Book)	-14,000.00
	$ 0.00

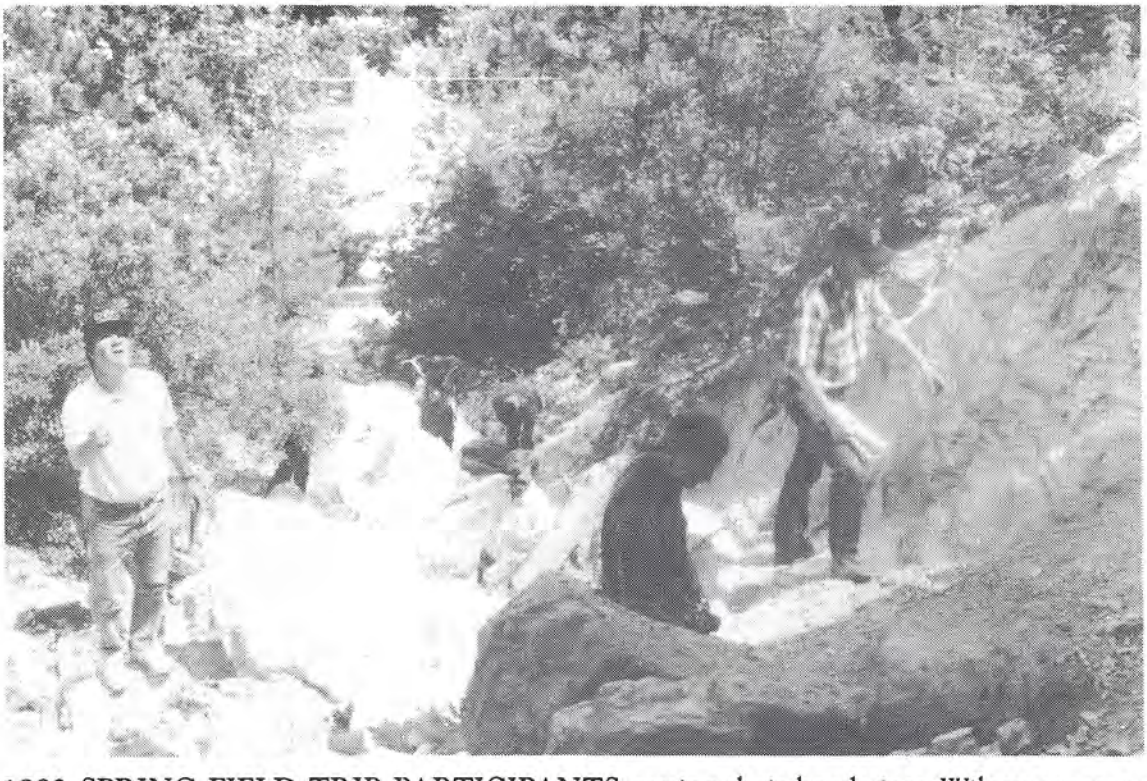
GROSS OPERATING EXPENDITURES

Bank Service Charge	$ 94.22
Quick Print (Ad Slick Knox Sem.)	31.88
Larry Baria (Reim. A.A.P.G. Conv.)	500.00
Fall BBQ '92	1,081.92
Luncheons	3,978.39
Compumail	403.00
Memorial - W. Johnson	50.00
Bulletin Printing	3,782.09
Northtown Printers (300 Copies Redbook)	1,130.33
Postage Acc.	475.00
Memorial - M. Harris	50.00
Memorial - S. Potter (Children's Fund)	200.00
P. O. Box Fee	35.00
Christmas Party	1,144.94
Jackson Trophy	158.63
Postage - Bulletin Adv.	16.24
Spring Fling '93	2,080.15
Office Environments	35.99
Jura-Search (Name Tags)	24.85
Horne CPA Group ('92 Tax Return)	350.00
UPS (Ship Redbook to E.E.)	42.50
Southeastern Oil Review (Adv.)	157.50
University Press (Oil in the Deep South)	5,525.10
TOTAL	$21,347.73

Revenues	6/1/92 - 5/31/93	$21,249.07
Expenditures	6/1/92 - 5/31/93	21,347.73
Net Loss From Operations		$ 98.66
Checking Account Balance	5/31/92	$ 1,331.24
Savings Account Balance	5/31/92	14,478.62
Cash Balance	5/31/92	$15,809.86
Checking Account Balance	5/31/93	$ 1,232.58
Savings Account Balance	5/31/93	14,877.01
CASH BALANCE	5/31/93	$16,109.59

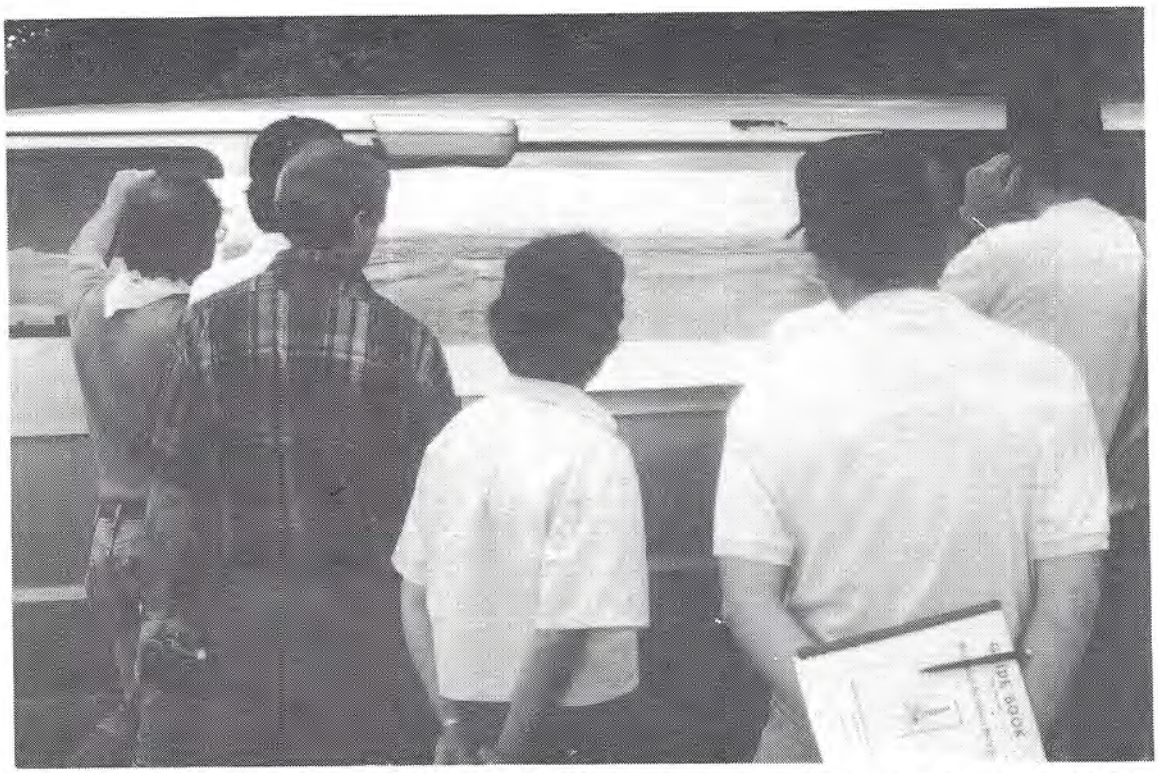
Ed Hollingsworth
Treasurer '92-'93

1993 SPRING FIELD TRIP TO MERIDIAN – Field trip organizer George Vockroth, center, with a few of the participants who enjoyed the trip.



1993 SPRING FIELD TRIP PARTICIPANTS getting their hands into Wilcox sequence stratigraphy.

1993 SPRING FIELD TRIP – Co-leaders David Dockery and Steve Ingram point out details of Mt. Barton area sequence stratigraphy.



1993 SPRING FIELD TRIP CO-LEADER Jim Coleman of Amoco, points out Wilcox sequence stratigraphy of eastern Mississippi on seismic section.

IT'S POP TEST TIME!!!

HERE ARE THE ANSWERS FROM LAST MAY'S QUIZ. COURTESY OF STANLEY KING

A-Today's name		B-Original name	
1.	Chaparral field	12	a. Amy field
2.	Raleigh field	6	b. Hamburg field
3.	Pickens field	9	c. Pidgeon dome
4.	Galloway Dome	14	d. Pickwick field
5.	Morton field	13	e. West Kings field
6.	Oldenburg field	1	f. Hiwannee field
7.	Magee field	13	g. Whistler field
8.	South Amory field	4	h. Galloway dome
9.	King's Dome	8	i. Quincy field
10.	Shubuta field	11	J. Ellislie field
11.	Armstrong field	3	k. Sharpsburg field
12.	Soso field	7	1. Maddox field
13.	Yellow Creek field	5	m. Independence Field
14.	Dexter field	2	n. Traxler field
		10	o. Mingo Creek field

PUBLICATION LIST

SPECIAL VOLUMES

1. Mississippi Geological Society Photo Directory, 1981 ..... $ 2.00
2. Wilcox Fields of Southwest Mississippi, Maps and production data on 171 fields, in ring binder, 350 pp., 1969 ..... 28.00

Mesozoic-Paleozoic Producing Areas of Mississippi and Alabama

3. Volume I. Maps and producing data on 57 fields, with 2 composite logs, clothbound, 139 pp., 1957 ..... (out of print)
4. Volume II. Maps and producing data on 77 fields, includes Supplement 1, in ring binder, 143 pp., 1963 ..... 15.00
5. Supplements 2 through 7 for Volume II, Maps and producing data on 35 fields, 110 pp 15.00
6. Supplement 8 for Volume II, Maps and producing data on 34 fields, 108 pp., 1980 ..... 25.00
7. Supplement 9 for Volume II, Maps and producing data on 19 fields, 82 pp 1992 ..... 25.00
8. Volume II complete with Supplements 2-9, 363 pp., 165 fields 75.00

FIELD TRIP GUIDEBOOKS

9. Upper Cretaceous Outcrops, Northeast Mississippi and West Central Alabama, Fourteenth Field Trip, 29 pp., May 1959 ..... 4.00
10. Cenozoic of Southeast Mississippi and Southwest Alabama Fifteenth Field Trip, 52 pp., May 1960 ..... 6.00
11. Cenozoic of Horn Island and the Pascagoula Valley 10th Annual GCAGS Meeting, 24 pp., October, 1960 ..... 2.50
12. The Paleozoics of Northwest Arkansas Sixteenth Field Trip, 28 pp., May, 1962 ..... 5.00
13. Tertiary Type Localities of East-Central Mississippi, 25th GCAGS Meeting, 133 pp., October 1975 ..... 5.00
14. Mississippi Rocks of the Black Warrior Basin, Seventeenth Field Trip, 79 pp., April, 19778 ..... 8.00
15. The Cretaceous Chalk of the Starkville area, eighteenth Field Trip, 69 pages, April 19-20, 1991 ..... 7.00

COMPOSITE LOGS AND CROSS-SECTIONS

16. Composite Mesozoic Log of South Mississippi and South Alabama 2.00
17. Composite Paleozoic Log of Black Warrior Basin, Mississippi and Alabama
18. Well Log Correlation Sections, Paleozoic of the Black Warrior Basin, Set of 5 Sections 10.00
19. Stratigraphic Cross-Sections, Jurassic of Mississippi, Alabama and Northwest Florida, Set of 9 Sections 50.00

Order From: EARTH ENTERPRISES INC. P.O. Box 672 Austin, Texas 78767

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Mississippi Geological Society, Inc.

P.O. Box 422, Jackson, Mississippi 39205-0422

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Last Name _____ First Name _____ Middle Initial _____

Is the current name and address on the back of the Bulletin correct?

Yes — Please sign below

No — Please indicate changes and sign below

This renewal is for year

19_____ - 19_____

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Office Mailing Address _____ Telephone _____

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Signature _____

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APPLICATION FOR MEMBERSHIP

Please complete and return this card with your annual dues ($20.00) ($5.00 student) to the above address. I hereby make application for:

New ☐ Renewal ☐ membership in the Mississippi Geological Society.

No sponsors needed for a renewal membership.

(PLEASE PRINT)

Last Name _____ First Name _____ Middle Name _____

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College or University Attended _____

Major Subject _____ Type _____

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Signature _____

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MISSISSIPPI GEOLOGICAL SOCIETY

VOLUME XLII NUMBER 2 OCTOBER 1993

PRESIDENT'S LETTER

Well, the Fall Bar-B-Q is behind us. I would like to thank everyone who helped make this a successful event, especially our sponsors. If you did not attend, as many did not, you missed a good chance to hear the latest scuttlebutt as well as a good meal. Thanks also to everyone who attended. I would also like to thank everyone who helps organize our luncheons. (You know who you are.) There is a lot of work that goes into preparing the room for the speakers.

The Shreveport Geological Society wants me to remind everyone of the upcoming GCAGS meeting in Shreveport. Also, it is not too late to sign up for short courses or field trips.

Our speaker for the October luncheon is Rick Turner of Kilgore, Texas. His talk "A model for the Evolution of Salt Diapirs and the Salt Dome Canopy, East Texas Basin" should relate very well to our Mississippi Salt Basin domes. With the rumors of a new discovery on the flanks of a shallow piercement salt dome in Mississippi, and the potential for increased activity, his talk should be particularly interesting.

Our luncheon meeting is Thursday, October 12 - so mark your calendar and make plans to attend.

Brian Sims

A Model for the Evolution of Salt Diapirs and the Salt Dome Canopy, East Texas Basin

by: James R. Turner, SW Operating Company

Seismic and well data at Palestine, Keechi, and Butler Domes in East Texas show a sequence of events for the development of the salt stock that is similar to that described in the literature. However, the salt dome overhang or canopy appears to result from a second period of growth after a cycle of burial. The overhang canopy develops because the stock growth is constrained by overlying beds. The overlying beds are uplifted and the salt spreads laterally along bedding planes that are splayed apart. Canopy growth ends when the underlying salt chamber is evacuated and a block of sediments is down dropped along a "vent closing fault". The sequence of events has been generalized into a model that applies to domes in intermediate depth basins.

Since the salt stock is smaller than previously expected, oil and gas prospects may be made closer to the salt stock beneath the canopy. Better interpretations of the structure below the canopy can be made, and better estimates of the volume of salt involved in the creation of the diapir can be determined.

Rick Turner is a native of East Texas and attended Stephen F. Austin at Nacogdoches, Texas where he received a B.S. Degree in Geology in 1973. Following a two-year tour in the U.S. Army, Mr. Turner attended Texas A & M University at College Station where he received a M.S. Degree in Geology in 1977.

Mr. Turner began his geological career with Gulf Oil Co. in Houston where he worked as an exploration geologist in the Gulf Coast Mesozoic. In 1981, Mr. Turner returned to East Texas to work as a consultant and independent geologist. From 1986 to 1993 he worked for FINA Oil and Chemical as an exploration advisor and log analyst. Currently, Mr. Turner is a consulting geologist working the ArkLaTex area.

Mr. Turner has served as President of the Shreveport Geological Society and President of the Shreveport Well Logging Society. His publications include articles on Kurten Field, Brazos County, Texas; low resistivity production from the Smackover; and salt movement.

Environmental Regulation and the Oil and Gas Industry – A Three Hour Seminar

SATURDAY, OCTOBER 9
8:30 a.m. - 12:30 p.m.
Conference Room 4-1 – Universities Center
3845 Ridgewood Road • Jackson, MS

THIS PROGRAM WILL COVER SITE ASSESSMENTS AND OTHER TOPICS RELATED TO OIL AND GAS EXPLORATION. THE SPEAKERS WILL BE:

John Milner, *Partner, Brunini, Grantham, Grower & Hewes* – "Overview of Environmental Regulations Affecting the Oil and Gas Industry"

Bob Rogers, *Chief of Emergency Response Branch, Mississippi Department of Environmental Quality* – "Effects on Oil and Gas Industry of Oil Pollution Act of 1990"

James Connors, *Eco-Systems, Inc.* – "Effects of Wetlands Regulations on Oil and Gas Industry"

Jefferson Stewart, *Partner, Brunini, Grantham, Grower & Hewes* – "Mississippi Regulations on Naturally Occurring Radioactive Materials (NORM)"

3 CLE CREDITS AND 3 AAPL CREDITS APPLIED FOR
The seminar registration fee is $15.00 per person. • CLE credit will require an additional fee of $3.00

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For information contact: Roger Jones – 948-6801

BUSINESS MEETING LUNCHEON

11:30 A.M. OCTOBER 12, 1993
Capitol City Petroleum Club, Smackover Room
JAMES R. (RICK) TURNER - Speaker
SW Operating Company

BUSINESS MEETING LUNCHEON SCHEDULE

October 12, 1993	January 11, 1994
November 9, 1993	February 8, 1994
	March 8, 1994
December 14, 1993	April 12, 1994
CHRISTMAS PARTY	May 10, 1994

SPRING FLING – May, 1994

Mississippi Geological Society – 1993-1994

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David C. Harrell	Thomas McGlothlin*	Baxter Smith*
Oleta R. Harrell*	Frederic F. Mellen*	Henry Toler*
Dudley J. Hughes	Maurice E. Miesse*	*Deceased

PROPOSAL

TO DEVELOP A STANDING LIST OF GEOLOGISTS AND GEOPHYSICISTS WILLING TO TALK ABOUT GEOSCIENCE TO CLASSES IN THE SURROUNDING SCHOOLS.

This program would hopefully improve young peoples understanding of earth science and the energy/minerals industries and better prepare them to deal with the energy and environmental concerns of the present and future. The Geological Society of America has a program in place that we can work with (Partners in Excellence) so getting participants willing to talk may be the biggest hurdle.

This may be handled by our Continuing Education Committee. We can make lists available to various science curriculum coordinators in the local schools and they can contact the participants directly for class presentations.

See Attachments (3)

LARS JOHNSON

– GSA Letter - p. 4
– top of p. 6

The Geological Society of America
3300 Penrose Place • P.O. Box 9140 • Boulder, Colorado 80301 • 303/447-2020 • FAX 303/447-1133

May 20, 1993

Mr. Lars Johnson
Bureau of Land Management
411 Briarwood Drive, Suite 404
Jackson, Mississippi 39206

Dear Lars:

Thank you for your interest in the Partners for Excellence Program (PEP). Please note that the National Earth Science Teachers Association's Earth Science Alliance partnering program has now merged its efforts with PEP.

Enclosed is a Partners for Excellence registration card and guidebook with some initial tips on partnering. Also enclosed is a copy of our teacher resource packet and a mining activities packet. These packets are available for all interested Partners.

Our goal is to promote effective partnerships between earth scientists, science teachers, and students throughout North America. To become a Partner for Excellence, simply fill out and return the enclosed registration card and information form.

Enclosed is a list of all Mississippi Partners for Excellence. Since PEP has recently expanded, many earth scientists and teachers from your region will not yet be aware of the program. Consequently, if you are in contact with other K-12 teachers, schools, or earth scientists in your area I urge you to contact them and invite them to become involved in the Partners for Excellence Program.

If you are aware of other scientist-teacher partnership programs in your area, please let me know about them. At PEP we seek to work with and through pre-existing programs whenever possible.

For additional information on initiating, developing, and sustaining partnerships please contact me at 800-824-7243.

Thanks for your interest in partnering and please let me know how I can help to enhance your partnering experiences.

Sincerely,

Edward E. Geary (FAX)

Edward E. Geary, Ph.D.
Coordinator for Educational Programs, GSA

Enclosures

"BOY, I DON'T CARE IF YOU USED TO BE A GEOLOGIST AND THOSE ARE WORLD CLASS HORNBLENDE CRYSTALS. THE COUNTY WANTS WORLD CLASS GRAVEL, SO START HAMMERING!"

GEOLOGIST RECEIVES INTERNATIONAL AWARD

Dr. David T. Dockery III chief, subsurface geology, Office of Geology, is the recipient of the first ever Gilbert Harris Award given by the Paleontological Research Institute. Three individuals were recognized for outstanding contributions to paleontology as part of the sixty-first anniversary reunion for members and friends in Ithaca, New York on August 14.

The Gilbert Harris Award, named for the institute founder, is given in recognition of excellence in contributions to systematic paleontology. Systematic paleontology is that area of paleontology concerned with description of the diversity of fossil species and investigation of the interrelationships. The award is given to a scientist who, through outstanding research and commitment to the centrality of systematics in paleontology, has made a significant contribution to the science. Dr. Dockery is widely noted for careful investigations of fossil mollusks from the Gulf Coast of the United States and the detailed and extensive publications resulting from these studies published by the Office of Geology. His first summary of the mollusks was published in 1977.

According to Warren Allmon, director of the Paleontological Research Institution, Dr. Dockery was not only picked to be the first recipient of the Harris award because of his outstanding work, but also because his work was so much like that of Harris.

The Paleontological Research Institution was founded in 1932 by Professor Harris to house his extensive library and fossil collections and to continue to publish his two journals, *Bulletins of American Paleontology* (begun in 1895) and *Palaeontographica Americana* (begun in 1916). Today, the institution houses one of the largest collections of invertebrate fossils in North America and *Bulletins of American Paleontology* is one of the oldest continuously published paleontological periodicals in the world.

GSA GUIDELINES

For the geoscientist..

- Identify a school, teacher, museum, or grade level where you feel you can be an effective partner.
- Offer to serve as a resource for your chosen partner, and discuss possible ways that you might be most effective.

Prior to your visit

- Arrange to see copies of the classroom text and of any district or school curriculum materials that are relevant.
- Let your partner know of any special equipment needed for your presentation.
- If you are unable to keep your commitment for a presentation, arrange for a suitable substitute or let your partner know of the problem as soon as possible.

When you visit

- Stop by the school or museum office and identify yourself, your reasons for being there, and your partner.
- Remember you are there to assist your partner.
- Bring enough materials (handouts, pamphlets, etc.) for your audience.
- With your partner, plan your presentation to focus on scientific concepts that are useful and relevant to the students' lives.

In the classroom

- Constantly be sensitive to your audience. Tailor your language and examples to the level of your audience for effective communication. Your partner can help you determine the appropriate level. Speak slowly and clearly.
- Remember that the need for hands-on activity is indirectly proportional to the grade level, and that learning styles of children vary. Some learn through oral presentations, some through visual, and some only through tactile. Thus, variety in your approach may increase your effectiveness.
- Relate career discussions to your own experiences and communicate the natural joys and enthusiasms that you feel about your chosen field. See your world through the eyes of a child.

PUBLICATION LIST

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PRESIDENT'S LETTER

I've just made it back from the GCAGS Convention in Shreveport. I had a good time seeing old friends as well as making new ones. I felt everyone I talked to was upbeat and looking forward to a good 1994, although most would like to see a better oil price. Although the exhibitors rarely change, it is good to see that their products are continually being upgraded to keep up with the latest technology and needs of our industry.

The GCAGS Annual Meeting is held during the convention. At this meeting the GCAGS gave our society an extension of time to establish the MGS-GCAGS Matching Scholarship Fund. (We have finished with the accountants, now we have to get by the attorney and the IRS.) Profits from the Knox Seminar, the Sequence Stratigraphy Seminar/Field Trip and our sponsorship of the book *Oil in the Deep South*, by Dudley Hughes are dedicated to this Scholarship. As the name suggests, the GCAGS will match any money we raise for this scholarship fund, including private donations. If anyone would like to make a donation to this fund please contact me or any one of the MGS officers. This new scholarship will not affect and will be in addition to the Boland Scholarship.

This month's speaker, Randy Johnson with Callon Petroleum in Natchez will get us up to date on the latest aspects of horizontal drilling. Although most people associate horizontal drilling with fractured reservoirs, especially chalk, Randy's talk will focus on horizontal drilling in a Wilcox Sandstone reservoir in Lockhart Crossing Field. I am sure this talk will give us some insight on how we may use horizontal drilling to enhance recovery and production rates fir some of our Mississippi fields.

This month's meeting is Tuesday, November 9. Mark your calendars and make plans to attend.

Recent Horizontal Drilling in Lockhart Crossing Field, Livingston Parish, Louisiana: Its Impact on Geological Interpretation

by: Randy J. Johnson, Callon Petroleum Co.

Recent horizontal completions drilled by Callon Petroleum Company in the Lockhart Crossing Field have further optimized production in the Lower Eocene First Wilcox Sandstone, a marine bar composed of 40-45 feet of very fine to fine-grained glauconitic sandstone. This reservoir has produced a total of 16 MMBO and 17 BCFG from 40 wells since 1982.

Well site geology was a key factor in these successful horizontal completions because these wellbores were not mudlogged; were not electrically logged; and cores were not taken. Over 2,800 feet of drill cuttings, taken at 10 foot intervals, were examined to maintain the drilling wellbore near the top of the sandstone where the highest values of permeability and porosity are present. By drilling horizontally, First Wilcox Sandstone structure was encountered that was not previously mapped using existing subsurface well control.

Callon's International Paper Company (IPCO) #6 well, the first of the three horizontal wells drilled in the Lockhart Crossing Field, flowed at a rate of 527 BOPD and 400 MCFGPD on a 15.5/64" choke with a flowing tubing pressure of 650 psi from the First Wilcox Sandstone in March of 1992. Current flowrates continue to average 600+ BOPD on a 32/64" choke. This well, located upthrown to a down-to-the-south fault, has produced over 227 MBO and should adequately drain this area of the reservoir. A second horizontal well, the IPCO #15, was sidetracked as a horizontal injector and is located near the geographical center of the field. The third and northernmost horizontal well in the field, the IPCO #7, has produced in excess of 47 MBO and continues to produce at rates in excess of 600 BOPD on choke.

Randy J. Johnson is a petroleum geologist in the Property Development Department for Callon Petroleum company. He has worked for the Mississippi Bureau of Geology and for Texaco U.S.A. Randy received a B.S. degree in Geology (1980)) from Millsaps College and has been employed with Callon Petroleum Company for the past ten years. He will discuss the petroleum geology on three horizontal drilling projects in the Lockhart Crossing Field, a Lower Eocene First Wilcox Sandstone reservoir in Livingston Parish, Louisiana.

Historical Shoreline Analysis of the Mississippi Gulf Coast

by: Stephen M. Oivanki, Jack S. Moody, and Barbara Yassin

ABSTRACT

Historical shoreline positions of the Mississippi mainland coast and the barrier islands were digitized for four periods of time. USGS T-sheets provided control for the 1850's, 1917, and the 1950's, while air photo interpretation was used for 1986 control. Data were transferred to ARC/INFO for analysis and display. The mainland coast shows moderate erosion near the border with Louisiana in Hancock County. Erosion rate there have averaged 7.4 acres per year for the past 136 years with resulting shoreline retreat rates as high as 4.49 meters (14.6 feet) per year. The central portion of the mainland shoreline is stabilized by a seawall and artificial beach, and shows only those changes effected by human modifications. The eastern shoreline near Alabama displays the highest rate of erosion where the Grande Batture Islands have been completely eroded away, exposing the previously protected marsh to higher wave energy. Land loss there has averaged 8.1 acres per year over the 136 year study period. The accompanying maximum shoreline retreat is 2.87 meters (9.42 feet) per year. The barrier islands south of the mainland coast are migrating from east to west in the direction of longshore drift, and are also showing a net 19.78 acre loss per year.

INTRODUCTION

The Mississippi Gulf Coast consists of 95 miles (153 km) of mainland shoreline north of the Mississippi Sound and 70 miles (113 km) of barrier island shoreline an average of 12 miles (19 km) offshore. Several islands within the Sound contribute another 10 miles (16 km) to the total of 175 miles (282 km). The mainland shore exhibits a full range of shoreline types ranging from natural marsh and beaches to armored seawalls with and without artificial beaches fronting them. Coastal development ranges from residential to recreational to highly industrialized. Several major ports are located along the Mississippi coast, and their operation and channel maintenance have a significant impact on the shoreline evolution.

The barrier island chain located 10 to 15 miles offshore defines the Mississippi Sound and protects the mainland shore from open Gulf wave energy. The barrier islands consist of Petit Bois, Horn, East Ship, and West Ship Islands, which are part of the Gulf Islands National Seashore, and Cat Island, which is privately owned. The predominant longshore

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drift is to the west, and Petit Bois, Horn, and East and West Ship Islands all show migration to the west. As part of the National Park system, these islands are unmodified by man, but do show some influence from dredging activities in the passes between them. Cat Island shows no migration trend.

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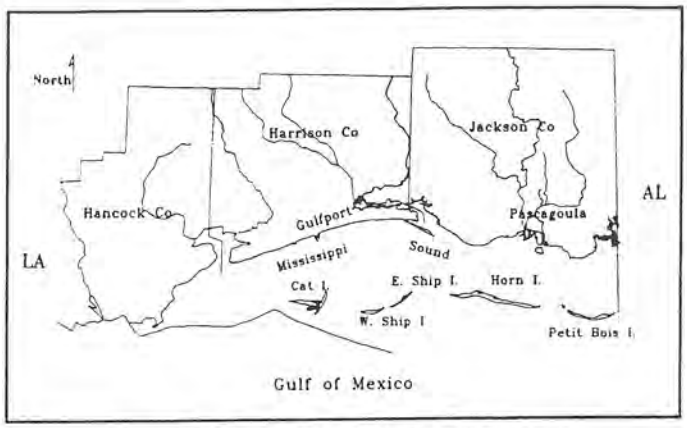

Figure 1. Index map of the Mississippi Gulf Coast area.

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Historical Shoreline Continued from Page 3

The Mississippi Sound is a relatively shallow (2.98 m average depth, MLW) estuary basin approximately 12 km wide by 130 km long with a surface area of 2129 sq. km (Higgins and Eleuterius, 1978). Six rivers empty into the Sound contributing a total discharge of 776 cu meters per second, and tides are diurnal with a range of 0.57 m (Eleuterius, 1978). Wave energy within the Sound is fetch-limited with predominant winds from the south and southeast.

Erosion rates along the Mississippi coast vary considerably depending on the shoreline type being affected, the geographical location, and the amount of human development and influence at a particular site. This research attempts to define the amount of shoreline change for individual geographic locations along the Mississippi coast and to relate those changes to the natural or man-made factors influencing the area.

METHOD

Historical shoreline position were acquired from U. 5. Coast and Geodetic Survey T-sheets. Data from the 1850s, circa 1917, and the 1950's were digitized from film copies of T-sheets at 1:10,000 or 1:24,000 scale by personnel at the Louisiana Geological Survey. A 1:24,000 scale air photo flyover was interpreted and digitized by LGS as the most recent data set. Digital files were transferred to the Office of Geology and entered into ARC/INFO for comparison and analysis. Possible errors in the location of the shoreline by this method can be as high as 10 m. All calculations computed in ARC/INFO were made without the deduction of possible error. By overlaying consecutive shorelines, linear shoreline retreat rates and area changes can be computed for the time periods mapped. Hurricane and storm data were acquired from the National Hurricane Center and the Mississippi Emergency Management Agency for the time periods studied. These storms have a major impact on the coast, and their frequency was related to shoreline change. Significant human development of the shoreline and major channelization and dredging projects were documented and related to the shoreline changes observed.

Where shorelines are interrupted by a stream or tidal channel or bay opening, an arbitrary closure of the opening was inserted to negate the effects of error introduced by the inclusion of the interior body of water in the calculations resulting from overlay of sequential shorelines. The same closure location was used for all shorelines. Total area change was computed only for the islands, since they constitute a discreet polygon in themselves, and can be measured by area for each time period studied. Charts for the barrier islands are included for area change both with and without the closure of

Continued on Page 5

Shoreline Analysis Continued from Page 4

channel openings. Man-made structures are included in the shoreline calculations where they appear as extensions of the land area.

RESULTS

Hancock County

Hancock County (Table 1), from the Louisiana border to St. Louis Bay, shows a total loss of 1039.4 acres during the period from 1850 to 1986. Most of this loss is concentrated from Bayou Caddy, where the seawall ends, westward to the Pearl River. This is a natural marsh shoreline which is being attacked by unrestricted wave energy from the southeast, since it is not protected by the barrier islands. Shore retreat rates along this section average 1.4 meters per year (Table 4). The Hancock County seawall, constructed between 1915 and 1928, stabilized the shoreline from Bayou Caddy to St. Louis Bay. The man-made changes shown in the table are related to this seawall and the dredging associated with its construction and protection with an artificial beach. Due to the timing of the surveys used for this study, the full effect of the beach nourishment projects in Hancock County are not shown since the beach was destroyed by hurricanes between surveys.

Harrison County

Harrison County is fronted entirely by a seawall and artificial beach. The seawall was constructed between 1924 and 1928, 42 km long, and is allegedly the second longest seawall in the world (Davis, 1988). The beach was pumped into place in 1951 to protect the seawall, which was severely damaged by the hurricane of 1947 (Wilson, 1951). The figures for loss and gain in Table 2 reflect the man-made influence in Harrison County since 1917, and the lack of natural changes since that time.

Jackson County

Jackson County contains probably the most diverse shoreline in Mississippi. Table 3 shows the loss and gain statistics for this county. The major port of Pascagoula is located in the central part of the county, and the man-made gains and losses shown in the table reflect the extensive modification of the shoreline as the port and shipyards were built. The gains are the result of dredge spoil disposal filling in wetlands. The losses resulted from the channelization of the Pascagoula River, and the diversion of its sediment-rich flow, which resulted in the destruction of what was once a prograding delta at the river mouth. The cities of Ocean Springs and Pascagoula are fronted by seawalls (approx. 9 km long) which have stabilized the shorelines in those areas.

The Belle Fontaine area, just east of Ocean Springs, contains the only natural sand beach left in Mississippi. The beach is composed of fine to medium-grained sand eroded from the Pleistocene Gulfport Formation which outcrops in a 1 - 4 meter high bluff near the center of the area. Sand is distributed east and west along the beach by longshore currents (Suhayda and Oivanki., 1993). Losses here account for 473 acres of the natural loss shown In Table 3.

The Grande Batture area is located at the eastern end of

Continued on Page 7

	1850-1917	1917-1950	1950-1986	1850-1986
MM Loss(ac)	0.0	6.1	6.5	105.1
MM Gain(ac)	0.0	0.0	29.1	12.1
Nat Loss(ac)	393.5	491.3	285.6	934.3
Nat Gain(ac)	88.2	15.8	16.1	0.4
Total Loss(ac)	393.5	497.5	292.0	1039.4
Total Gain(ac)	88.2	15.8	45.2	12.5

Table 1. Hancock County mainland shoreline area changes.

	1850-1917	1917-1950	1950-1986	1850-1986
MM Loss(ac)	8.6	15.0	144.6	44.7
MMGain(ac)	123.8	667.8	105.1	612.4
Nat Loss(ac)	206.6	0.0	0.0	0.0
Nat Gain(ac)	37.3	0.0	0.0	0.0
Total Loss(ac)	215.13	15.0	144.6	44.7
Total Gain(ac)	161.7	667.8	105.1	612.4

Table 2. Harrison County mainland shoreline area changes.

	1850-1917	1917-1950	1950-1986	1850-1986
MMLoss(ac)	73.9	196.4	105.6	165.8
MM Gain(ac)	111.4	430.7	1000.7	1310.8
Nat Loss(ac)	1243.4	762.3	588.8	1843.8
Nat Gain(ac)	535.9	415.8	76.0	317.4
Total Loss(ac)	1317.7	958.7	694.4	2009.6
Total Gain(ac)	647.3	846.6	1076.7	1628.2

Table 3. Jackson County mainland shoreline area changes.

1850 - 1986	Avg. Total Retreat	Avg. Retreat/yr
W. Hancock County	195.7m	1.4m
Grande Batture Is.	290.0m	2.1m
Pt. Aux Chenes Bay	93.6m	0.7m
W. Jackson Co. Marsh	164.9m	1.2m
Petit Bois Is.	356.8m	2.6m
Horn Is.	458.9m	3.4m
Ship Is.	406.2m	3.0m
Cat Is	187.4m	1.4m

Table 4. Retreat rates for selected Mississippi shorelines.

	1850-1917	1917-1950	1950-1986	1850-1986
MM Loss(ac)	0.0	0.0	2.3	0.0
MM Gain(ac)	0.0	2.3	0.0	0.0
Nat Loss(ac)	136.2	110.6	81.2	288.0
Nat Gain(ac)	31.9	11.8	12.2	15.9
Total Loss(ac)	136.2	110.7	83.5	288.0
Total Gain(ac)	31.9	14.1	12.2	15.9

Table 5. Deer Island shoreline area changes.

	Nat Loss(ac)	Nat Gain(ac)
1850-1917	27.2	6.5
1917-1950	32.6	0.4
1950-1986	31.5	0.3
1850-1986	84.4	0.4

Table 6. Round Island shoreline area changes

	1850-1917	1917-1950	1950-1986	1850-1986
Petit Bois chg(ac)	-248.7	-320.4	-220.0	-789.1
Horn chg(ac)	+55.3	-293.7	-262.6	-501.0
Ship chg(ac)	-127.1	-352.6	-152.7	-632.4
Cat chg(ac)	-175.4	-339.7	-267.9	-783.0
Sand chg(ac)	-	-	+50.1	+50.1
TOTAL	-495.9	-1306.4	-853.1	-2655.4

Table 7. Barrier island total area changes.

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the county and overlaps into Alabama. It is an abandoned delta complex of either the Pascagoula River (Gazzier, 1977) or the Escatawpa River (Otvos, 1985). Erosion of the delta and associated islands has resulted in the total destruction of the Grande Batture Islands within recent memory, and the exposure of the previously protected interior marshes to much higher wave energy (Kramer, 1990). Shore retreat rates here (average 2.1 m/yr) are the highest anywhere along the Mississippi mainland shoreline. A total loss of 1400 acres has occurred in this area from 1850 to 1986.

Interior Islands

Two natural islands, Deer Island and Round Island, are located within the Mississippi Sound between the mainland and the barrier islands. Both islands are remnants of Pleistocene beach ridges covered with a veneer of recent sand (Otvos, 1985). Shoreline losses for these islands are shown in Table 5 and Table 6. The man-made changes on Deer Island are the result of dredging and breakwater construction to protect the harbor at Biloxi.

Barrier Islands

The most recent and detailed analysis of changes on the Mississippi barrier islands was done by Byrnes, et al. (1991). He described the average yearly shoreline retreat rates and migration rates as well as the yearly average area change for each of the islands. The data used included some of the same data utilized in this report. The barrier islands show a steady pattern of erosion between 1850 and 1986. Table 7 gives the total area change for each of the islands in the trend calculated by comparing the total island area for each time interval. The closure of streams, tidal channels, and tidal bays which connect with the open Gulf or Sound resulted in differences of as much as 141 acres for an individual island area compared with an area measured with the channels and bays left open and considered as part of the surrounding water body. Retreat rates for the islands, as shown In Table 4, were measured on the north and south shores of the islands, since the east - west migration would give an exaggerated figure if measurements were taken on the ends of the Islands.

Petit Bois Island, Horn Island, and Ship Island(s) are part of the Gulf Islands National Seashore, and as such are protected from man-made disturbance. Cat Island is privately owned, but the only man-made change there is an access channel dredged to the interior; but this was eliminated by the method used for this analysis which closed off all interior channels prior to measurement. The park islands all show migration to the west in the direction of longshore drift. The abrupt and significant increase in total island area loss after 1917 is attributed to the beginning, during that time period, of channel maintenance by dredging between the islands, resulting in a cutoff of the natural sediment migration from island to island. Analysis of storm events impacting the Mississippi shoreline during the time periods studied shows a decrease in storm events per year during that time. A sediment bypass project between Petit Bois Island and Horn island resulted in the building of Sand Island from dredge spoil, but the overall effect of channel maintenance can still be seen on all of the islands. Some spoil from the Gulfport channel was placed around Fort Massachusetts at the west end of Ship Island to protect the fort from destruction by erosion, but this has been discontinued due to relocation of the channel to the west.

SUMMARY

The mainland coast of Mississippi has lost approximately 3148 acres to natural erosion between 1850 and 1986. Man-made accretion has recovered about 1725 acres during the same time period. The most endangered sections of the mainland coast are the marsh shorelines in western Hancock County and eastern Jackson County where the highest retreat rates are affecting wetlands. The barrier islands serve to protect the mainland shoreline from open Gulf of Mexico wave energy. Their steady erosion and loss of 2655 acres is cause for concern. A change in channel maintenance and dredge spoil disposal policies is indicated to protect these valuable Islands.

ACKNOWLEDGEMENTS

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VOLUME XLII NUMBER 4 DECEMBER 1993

PRESIDENT'S LETTER

The Holidays are upon us again. I would like to wish everyone a Happy and Prosperous New Year. I know I have a lot to be thankful for in 1993, and I hope you do also. I am enthusiastic about 1994 and am looking forward to the challenges that await us. The opportunities are there, however, sometimes it takes a little extra effort to find them. As the saying goes...a little hard work never hurt anyone.

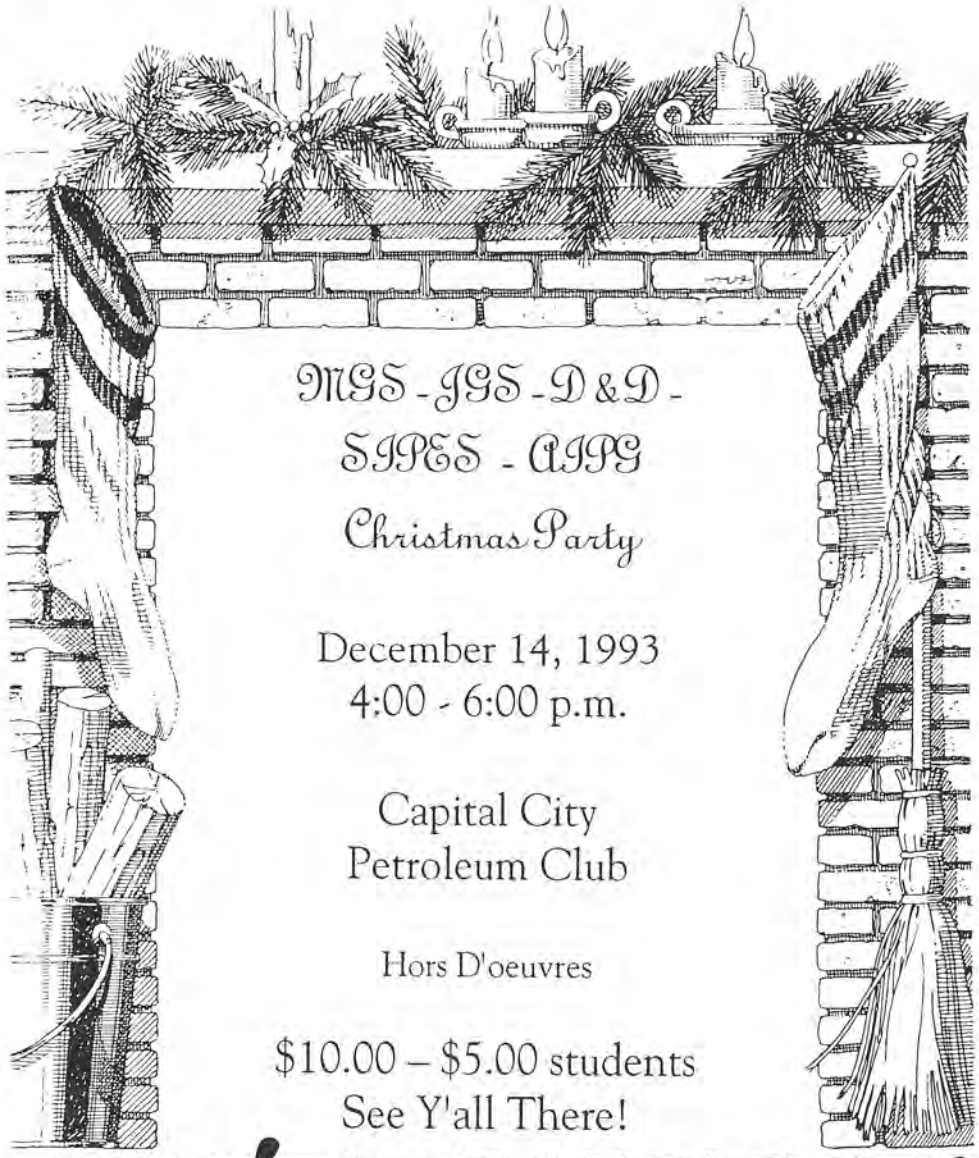
January will start a new advertising year for the society. I would like to thank everyone who is presently advertising in the Bulletin for their continued support. If you are not advertising, I encourage you to do so. It is a great way to show your support for the society. Please contact me at 352-7736 to place your ad in the Bulletin.

This month's meeting will be out annual Christmas Social. It will be held Tuesday, December 14 at the Petroleum Club from 4:00 p.m. to 6:00 p.m. This year's social will be co-sponsored by several local oil and gas industry societies. We look forward to a great turnout.

There are still some people who have not paid their dues for 1993-1994. If you have not renewed your membership, please do so. Our dues are one of the main sources of income for the society. Along with advertising income, our dues help pay for the printing of the Bulletin as well as offset any losses we may incur at other society events. If you are not sure whether you are current on your dues or not, please call Roger Bergeron at 961-5214 and he will let you know.

See you December 14! Happy Holidays!

– Brian Sims



Michael J. Manning – Borehole Imaging Update

The SPE Meeting on December 8 will have Michael Manning of Halliburton speaking on Borehole Imaging. His talk should be of interest to geologists as well as engineers. The meeting is Wednesday, December 8 at 11:30 in the Petroleum Club. Be sure to call David Hilton of Pruet Oil (948-5279) for reservations.

Abstract

Understanding the internal geometry of porous rocks is useful for geological study of deposition and diagnosis, especially where heterogeneities affect fluid flow characteristics and reservoir performance. Access to this information has been significantly advanced by development of wireline log imaging tools, processing, and visualization techniques. Quantitative use of borehole images for analysis of both thin beds and secondary porosity is an area of active development. Manning reviews state-of-the-art borehole imaging with specific examples to illustrate successful well completions and commercial production.

Biography

Manning is chief petrophysicist for Halliburton Logging Services, specializing in dielectric log analysis, effects of oil muds on formation evaluation, borehole imaging, and thin bed evaluation. Prior to joining Halliburton, he worked as a Schlumberger well-logging engineer and in a formation evaluation group with Gulf Oil Co. He has a BS degree in physics from North Carolina State U. and an MS degree in physics from Pennsylvania State U.

BUSINESS MEETING LUNCHEON

11:30 A.M. DECEMBER 14, 1993

Capitol City Petroleum Club, Smackover Room

CHRISTMAS PARTY

BUSINESS MEETING LUNCHEON SCHEDULE

December 14, 1993
CHRISTMAS PARTY

January 11, 1994
February 8, 1994
March 8, 1994
April 12, 1994
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SPRING FLING
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Mr. Larry Walter, former MGS President

Lawrence E. Walter Jr., 64, a retired consulting geologist, died of cancer Monday, November 1, at Mississippi Baptist Medical Center in Jackson.

Memorial services were at St. Luke's United Methodist Church in Jackson. His body was donated to the University of Mississippi School of Medicine.

Mr. Walter, a native of Cimarron, Kan., was a Korean War Army veteran, serving in the 2nd Division. He received a master's degree in geology from Kansas University in 1959. He worked for the PanAmerican Oil Co., first in New Orleans and later in Jackson. He was a district geologist for Skelly Oil Co. before working as an independent consultant. He was president of the Mississippi Geological Society in 1973-75 and was a lifetime member of the University Club and member of St. Luke's United Methodist Church.

Survivors include: son, L. E. "Chip" Walter of San Diego; brothers Dale Walter of Lawton, Okla., Kenneth Walter of Kansas City, Kan., and Charles Walter of Larned, Kan.; sisters, Gracie Walter of Pratt, Kan., and Jerriene Hawley of Hutchinson, Kan.; and two grandchildren.

Memorials may be made to the American Cancer Society, Mississippi Division, 1380 Livingston Road, Jackson, MS 39213, or a favorite charity.

modified and reprinted from the Clarion Ledger, Nov. 3, 1993

Global Positioning System (GPS) and its Applications in the Oil Industry

by: Steven Oivanki, Mississippi Office of Geology

What is GPS?

GPS is a navigation and positioning system developed by the U. S. military to achieve very precise autonomous position information anywhere in the world under almost any conditions. It was the deciding factor in positioning Allied forces during the Desert Storm conflict. It utilizes distance ranging information from a constellation of 24 satellites orbiting the earth at an altitude of about 11,000 miles. The orbits of the satellites are arranged and measured with extreme accuracy such that from any point on the face of the earth at any given time there are at least four satellites visible. The satellites are also equipped with atomic clocks so that time can be measured from each one with the greatest accuracy possible. Each satellite transmits continuous radio signals with discrete coding which can be interpreted by receivers on the ground. By measuring the travel time of each signal from each satellite and triangulating the best solution, the receivers can pinpoint their location on the earth to within a centimeter or less. The system works night and day, rain or shine, and is impervious to jamming. The only requirement is line-of-site visibility with the satellites. The receivers are self-contained computers that are user-friendly, easily portable (some are pocket-size), and relatively inexpensive. It sounds almost too good to be true, and in some ways it is.

Selective Availability

The military for security reasons has decided to deny the general population of civilians the benefit of GPS precise accuracy. In order to foil "terrorists, communists, and other unfriendly forces," they have introduced a deliberate error into the system, called Selective Availability or SA. The clocks on each of the satellites are deliberately and randomly tinkered with to give inaccurate timing broadcasts. They also encrypt the most accurate radio signal such that only military receivers can decode it. The net result is a computed position accuracy of between 100 and 300 meters, which is less accurate than pacing off of a road on a topographic quad sheet with a compass at night. There is a way to overcome this error, however, and it is relatively simple.

If the satellites transmit the same erroneous signal to two receivers at the same time, then the error computed by each receiver should be the same. If one receiver is positioned over a point whose position is already known with great accuracy, such as a surveyed benchmark, then that receiver can compute the corrections to the signal necessary to place itself where it already knows that it is. Since the signals to each receiver are the same, then the same correction can be applied to the other receiver, thus defeating the error induced by SA, as well as any atmospheric errors that might occur.

Global Positioning *Continued from Page 4*

This is known as differential correction, and it is currently the only way to achieve accurate positioning with GPS outside of the military. You might ask yourself, "If it is that easy to overcome SA, why wouldn't an 'unfriendly force' use the same method to overcome it during a conflict?" The answer to that question has been echoing through the minds of every GPS user in the world for years, but that still has not changed the official U. S. military policy.

Base Stations

A receiver positioned over a benchmark during a GPS survey is referred to as a base station. Data from the base station is used to differentially correct data from other receivers in the field to achieve the greatest accuracy possible. Since it is very inefficient from a cost and time standpoint to have someone sitting on a remote benchmark in the woods with a receiver every time you want to compute a position in the field, the Department of Environmental Quality (DEQ), with a grant from the EPA, has established three permanent GPS base stations in Mississippi. These stations are in Oxford, Jackson, and Biloxi, and they provide differential GPS coverage for the entire state. The stations are located on the roofs of state buildings where GPS antennas receive signals for 12 daylight hours each day and store the data in an onsite computer. The station locations have been surveyed to A-order accuracy by the National Geodetic Survey, and are part of the state-wide High Accuracy Reference Network (HARN) recently completed in Mississippi to adjust the NAD 83 datum to GPS accuracy standards.

The data from these base stations are available free of charge to any GPS user in the state. An electronic bulletin board service has been set up at DEQ in Jackson to access the data by modem. The base stations are Trimble Pathfinder Community Base Stations, and use the Trimble P-Finder software format. They support differential corrections for Trimble Pathfinder field units, and the data can be converted with moderate difficulty to other formats by software provided with other brand receivers. The Trimble Pathfinder units operate on the C/A code frequency, which is the least accurate, and least expensive to use, of the GPS frequencies. Measured positions of known benchmarks have been calculated to within 1 meter accuracy using this equipment, and accuracies of 1 - 5 meters are common.

Oil Industry Applications

Anyone who has worked in the oil industry, especially in the Wilcox trend, knows that all reported and published well locations are absolutely accurate. And if they actually believe that, then they probably also believe that the success rate for Wilcox development wells is 100 per cent. The one ingredient in a geologic map that is almost always taken for granted as gospel, but almost never is, is the location of previously drilled wells. Significant mis-spotting of wells can be disastrous where objective horizons are geographically narrow and complicated. GPS provides a solution to this dilemma.

Rather than pacing a staked location from a topographic quad, a GPS receiver can locate that staked location in ten minutes without a map at all. Previously drilled dry holes, and especially currently producing wells, can be checked for location accuracy just as easily. Even within developed fields, the inaccuracy in reported and published locations can lead to undrilled interior and flank locations when the wells are put in their actual positions on a map. This has happened in Texas, where aerial photo well spotting was used to update base maps drawn with published locations. Busted units and illegal unit well locations can also be checked using the accuracy of GPS. Property boundaries can be mapped as easily as walking a fence line or road with a receiver, then plotting the results on a map. The possibilities are limitless.

Receiver Types and Cost

In GPS, just as in anything else, you get what you pay for. If survey accuracies of less than a centimeter are important to you, then you will need several dual-frequency Y and P-code receivers at a cost of $10,000 to $50,000 each. If you just want to locate something to within a couple of meters, sufficient for most geologic mapping, then a C/A code receiver will do the job for about $1,000 to $6,000 depending on the quality of data you want to record. Cheap receivers are everywhere today, and any manufacturer can buy a GPS module, stick it in a case and sell it with his brand name on it, and many do. The Department of Environmental Quality chose the Trimble Pathfinder equipment after lengthy research and discussions with other users. It had the best overall reliability, accuracy, and user support for the price at the time of all the manufacturers surveyed. The receivers cost about $6,000 each, and come with all software needed for differential location calculations. Each potential user should evaluate his individual needs and budget and act accordingly. The cost of receivers is constantly dropping as demand and competition increase, so by the time this is published a better deal will probably be available .

Considering the cost of seismic, leases, location costs, and drilling for a normal prospect, the price of a GPS receiver is minimal; and it can pay for itself just by the savings in conventional location survey costs for one location. Considering the possible prospect development in established fields by accurately respotting wells, GPS is a wise investment for any petroleum geologist or company. Besides, you can put it in your car when you travel and amaze your wife when she accuses you of being lost and too proud to ask directions.

This has been a brief and very superficial discussion of the topic of GPS. If you have any questions or need additional information about the DEQ Base Station Network, you can reach me at the Office of Geology, 601-961-5518.

PUBLICATION LIST

SPECIAL VOLUMES

1. Mississippi Geological Society Photo Directory, 1981 ..... $ 2.00
2. Wilcox Fields of Southwest Mississippi, Maps and production data on 171 fields, in ring binder, 350 pp., 1969 ..... 28.00

Mesozoic-Paleozoic Producing Areas of Mississippi and Alabama

3. Volume I. Maps and producing data on 57 fields, with 2 composite logs, clothbound, 139 pp., 1957 ..... (out of print)
4. Volume II. Maps and producing data on 77 fields, includes Supplement 1, in ring binder, 143 pp., 1963 ..... 15.00
5. Supplements 2 through 7 for Volume II, Maps and producing data on 35 fields, 110 pp 15.00
6. Supplement 8 for Volume II, Maps and producing data on 34 fields, 108 pp., 1980 ..... 25.00
7. Supplement 9 for Volume II, Maps and producing data on 19 fields, 82 pp 1992 ..... 25.00
8. Volume II complete with Supplements 2-9, 363 pp., 165 fields 75.00

FIELD TRIP GUIDEBOOKS

9. Upper Cretaceous Outcrops, Northeast Mississippi and West Central Alabama, Fourteenth Field Trip, 29 pp., May 1959 ..... 4.00
10. Cenozoic of Southeast Mississippi and Southwest Alabama Fifteenth Field Trip, 52 pp., May 1960 ..... 6.00
11. Cenozoic of Horn Island and the Pascagoula Valley 10th Annual GCAGS Meeting, 24 pp., October, 1960 ..... 2.50
12. The Paleozoics of Northwest Arkansas Sixteenth Field Trip, 28 pp., May, 1962 ..... 5.00
13. Tertiary Type Localities of East-Central Mississippi, 25th GCAGS Meeting, 133 pp., October 1975 ..... 5.00
14. Mississippi Rocks of the Black Warrior Basin, Seventeenth Field Trip, 79 pp., April, 19778 ..... 8.00
15. The Cretaceous Chalk of the Starkville area, eighteenth Field Trip, 69 pages, April 19-20, 1991 ..... 7.00

COMPOSITE LOGS AND CROSS-SECTIONS

16. Composite Mesozoic Log of South Mississippi and South Alabama 2.00
17. Composite Paleozoic Log of Black Warrior Basin, Mississippi and Alabama
18. Well Log Correlation Sections, Paleozoic of the Black Warrior Basin, Set of 5 Sections 10.00
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Ground Water Cleanup – A Collision Course?

by James H. May

As a point of critical importance in the National effort to clean up our potable groundwater aquifers, I would like to discuss the controversial issue of whether contaminated ground water should be treated at the production well in lieu of defining and removing the contaminants from the aquifers in general. The Environmental Protection Agency will have to face this issue head on during the coming months, as it becomes clear that the costs of cleaning up aquifers to pristine conditions is cost prohibitive and in most cases impossible. Members in the Association of Engineering Geologists who have experience in the "oil patch" can readily lend insight into this perplexing problem. Petroleum geologists are keenly aware that accurately defining the extent of petroleum bearing sediments in the subsurface is a costly and less-than-precise exercise. We are also aware that once petroleum is located there is no known way to remove it all. This fact of science is being overlooked by many of the regulators and lawyers who are playing key roles in cleanup efforts across the Country. Most of the laws and regulations are implying that most aquifers can be cleaned to their original conditions. Cleanup cost and geologic expertise are on a collision course based on current regulatory requirements.

As an example of this impending collision of philosophies, I will address several situations that we will ultimately face as we try to clean up numerous manufacturing sites and military complexes that are contaminated to such a degree that 100 % cleanup is not feasible. At many of these sites, such as Rocky Mountain Arsenal (RMA) near Denver, Colorado. the major sources of contamination have been removed, but total removal of all hazardous material cannot be guaranteed. The minor amounts of contamination remaining in the ground water at RMA are being treated at the three boundary control systems. This approach supports the philosophy of treating ground water where it is exiting a site or where it is being used rather than to restore every square foot of aquifer to its original condition. In the case of the Rocky Mountain Arsenal it is scheduled to become a National Wildlife Refuge and is not expected to be available for public or commercial development.

I would now like to present a set of hypothetical hydrogeologic and contaminant conditions which I feel will put the aforementioned choice of philosophies in proper perspective. I was recently asked to review a report concerning a site in Hawaii which was contaminated with trichloroethene (TCE). What caught my immediate attention was the cost estimate for installing monitoring wells for the area of concern. These estimates were extremely high for a single monitoring well. I thought at first that this was a misprint, but after checking with Mobile District Corps of Engineers personnel who do drilling in all parts of the world, I found that the estimates were in the ball park. How could a single monitoring well cost so much? The logistics involved in installing a 600 foot deep monitoring well in fractured basalt are quite formidable. Many of the older water wells in the area were drilled with old cable tool rigs. A large modern rig suitable for drilling and installing a 600 to 700 foot deep monitoring well had to be brought in at great expense. Drilling supplies that are taken for granted on the Mainland are difficult or impossible to obtain locally. The large specially designed air hammers used for drilling the wells were costly. The geology also contributed to the high costs of well installation because of basalts containing fractures, lava tubes and clinker zones. No definitive conclusions have been drawn regarding the source of contamination or potential flow paths until additional data is gathered to evaluate hydraulic gradients, ground-water velocities, and recharge and discharge sources. To further complicate the problem of locating source areas, TCE was used to control dust on many of the roads in the area. Several landfills in the area are also potential sources.

The classical approach to contaminated ground-water problems involves defining the vertical and horizontal extent of contaminant plumes. At some sites this has involved the installation of hundreds of wells. At Rocky Mountain Arsenal thousands of wells have been installed. At many of the contaminated sites the exact extent of contamination is still not clear even after the installation of a vast array of wells. With the cost of well installation in areas such as Hawaii so high will it be possible to define the extent of contamination or will this prove to be a turning point in our Countries' approach to cleaning up sites where contaminated ground water is the main problem ? The Hawaii Island site may be a case in point where it is more reasonable to treat the contaminated ground water at the production wells than to try and define the exact extent of contamination throughout the entire aquifer and remove and treat (or treat in place) the entire plume. Obviously the sources should be located and removed if possible.

I believe that as more statistics are generated which show just how few aquifers are actually being cleaned up, the philosophy of treating the water at the production wells will appear much more attractive. A few more sites like the example in Hawaii will certainly make the regulators stop and take a close look at the options. During these times of budget restrictions the costs of cleaning up large aquifiers to their original conditions are becoming increasingly restrictive .

I would enjoy hearing views on the above topic. I continue to urge you to use the Ground Water Committee as a means of communication and technology transfer to the AEG members at large. Please send any item of interest to James May, U.S. Army Corps of Engineers, Waterways Experiment Station. WESGG-YH, 3909 Halls Ferry Road, Vicksburg, MS 39180 or call me at 601-634-3395. (FAX 601-634-3139).

reprinted from AEG News, 36/3, Summer 1993 P. 14 & 15.

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VOLUME XLII NUMBER 5 JANUARY 1994

Direct Sensing Techniques

Steve Champlin, Rick Ericksen, Jack Moody, Ed Sticker and Stan Thieling*

The Coastal and Energy Division of the Office of Geology is currently evaluating a variety of direct sensing techniques for the detection of hydrocarbons. The techniques being evaluated are all commercially available and have been used by operators within Mississippi. To date three techniques have been run in various combinations over twelve fields in southwest and central Mississippi. Due to budget restraints, our current work has been done on a reconnaissance or non-detailed basis. The various techniques were selected to include one from each of a variety of categories.

Radiometrics is one of the most common direct sensing techniques. The most publicized radiometric technique on the market today is windowed radiometrics, which records total background radiation and, through a wavelength "window", one or more of the elements which make up the background. This technique was run over all the fields. It can be run from a vehicle, a four wheeler, or even back packed if the terrain requires. It is rapid and one of the least expensive techniques evaluated at approximately $1000/ day.

Soil gas detection was run over four fields to date. The soil gas detection method used detects and records seven gases ranging from methane to n-butane. The probe is incorporated in a hydraulically powered auger mounted in the bed of a pickup truck. It is a moderately rapid and moderately expensive technique, at about $100/hole, with nearly instantaneous field results.

Hydrocarbon "eating" microbe detection was run over the same four fields as soil gas. Results have been received from three fields and the fourth may be received by January 11. Microbes in this technique are used to detect ethane, n-propane, n-butane, and isobutane. Company personnel may be used in sample collection for this technique, making it quite inexpensive at about $30/sample. It is however, the slowest of the evaluated techniques in receiving results with a minimum of a one week waiting period. The technique may be used wherever the sample collector can go and come back toting the samples.

The office of geology has arrangements to add at least one additional technique to this study. We are contacting other sources to include and evaluate an even wider range of techniques. It is possible that certain of these already evaluated techniques will be run additionally in the future. We are working to secure funding to run in-depth studies of these and other techniques. Your comments would be appreciated.

The Office of Geology would like to acknowledge and thank the following companies and people for their donations of their time and equipment: Dr. Lewis R. Brown of Mississippi State University; GeoChem Tech Corporation of Dallas, Texas; and Chris A. Hall of Radex OGP, Inc. , Mesquite, Texas.

PRESIDENT'S LETTER

I would like to start by thanking everyone who helped make our Christmas Party a success. I would also like to thank everyone who attended. This year's crowd was the largest we've had in years.

Well, back to business. The speaker for our January Business Luncheon is our own Stan Thieling. His talk, "Direct Sensing Techniques", is from an ongoing Office of Geology project. Although some of you may have visions of "blackbox", Stan assures me we will be pleased with some of the results to date.

I recently had a preview of one of the tools used in this study. I was pleasantly surprised that it confirmed our original ideas.

I am sure all of you who have had positive experiences with these tools and those who still need some "convincing" will add to the talk with your comments and questions. — So come on out and relate your experiences or express your concerns.

See you January 11!

– Brian Sims

Earth and Sky Program featured

The nationally broadcast *Earth and Sky* program featured twice daily at 9:00 a.m. and 7:00 p.m. on NPR (National Public Radio) will air two programs in January which feature science in Mississippi. The programs are the result of research projects being conducted by the Mississippi Office of Geology.

On January 3, the program deals with coastal erosion and the experimental approach the coastal staff has designed for the Bell Fontaine Area of Jackson County, Mississippi's only natural beach. The January 10 broadcast deals with geochemical exploration methods which the energy section staff has been conducting over a number of oil and gas fields in Mississippi. These programs go out over 500 stations in the USA and abroad. The NPR network covers all of Mississippi, so inquire as to your local station, In Jackson it is 91.3 FM.

Earth and Sky is a science word bite program, very short, designed to expose the audience to science made interesting for the general public. We hope you'll tune in.

BUSINESS MEETING LUNCHEON

11:30 A.M. JANUARY 11, 1994

Capitol City Petroleum Club, Smackover Room

Stan Thieling - Speaker
Mississippi Office of Geology

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EXPLORATION TECHNIQUES - A Summary of Current Direct Location Technology

by Reed Tompkins

Eschaton Exploration, Spring, Texas

Author's Note:

When this paper was originally printed, it was intended as a general overview of a few selected, well published, remote sensing techniques. Due to space limitations, not every technology and/or contractor could be covered nor was this the purpose. However, this paper was to show that one underlying geochemical theory can and does explain most forms of remote sensing. Some updates have been added in italics.

Since the early 1970s, extensive reexamination of what has been called "unconventional exploration technology" has led to some major advances in this field.

These tools come to us in the form of geochemistry, radiometrics, helium surveys, micromagnetics, metal halos, induced polarization, and a host of lesser known geophysical toys.

The personal computer and advanced analytical techniques have allowed scientifically minded entrepreneurs to advance into realms of exploration research normally reserved for major companies. With the diversification of research, higher oil prices, and diminishing drilling results, a flood of advanced exploration concepts has hit the industry.

Unfortunately, each area of research has tended to create cause and effect theories that catered to that particular science, giving rise to many seemingly unrelated theories regarding the properties of oil reservoirs and their effect on surrounding systems.

In an attempt to create a unified theory, the author endeavored to study every form of "black box" technology that has had some degree of success. The study has resulted in a unified theory relative to what might properly be called direct location technologies (DLT) .

Direct Location Technology (DLT)

Direct location technologies include all methods that relate to processes or phenomena directly or indirectly induced by hydrocarbons.

Indicators such as seismic (except bright spot technology), subsurface mapping, standard magnetics and gravity are considered symptomatic in nature. Symptomatic technologies

give structural or lithological indications as to the possible locations of hydrocarbons but tell nothing as to their direct occurrence.

On the other hand, DLTs indicate hydrocarbon presence but tell nothing relative to physical entrapment. DLTs include some of the old standards such as geochemistry and Landsat, and also the newer forms of micro-magnetics, earth radiation analysis (ERA), and magnetic electrical tellurics.

All direct location phenomena appear to be directly related to a single underlying chemical process. In order to better understand that primary generating agent, the following theory is first presented prior to the discussion of individual technologies in order to show that one underlying agent can create numerous effects.

This DLT process theory is built upon data taken from numerous technologies, all of which demonstrated a fair degree of success and repeatability. The work of other researchers, field data published and unpublished, and laboratory experiments contributed to this concept.

DLT processes theory

All details are not currently understood, but it is felt that the following concept will hold true for future testing and is outlined as follows:

I. In the oil and/or gas reservoir, natural subsurface hydrostatic pressure forces the saturation of overlying sealing agents (shales and/or limestone) with hydrocarbons from the reservoir (Fig. 1). No known shale is absolutely impermeable, and with the addition of micro-fracturing, all shale seals are considered permeable.

Numerous studies indicated all oil and gas fields to be in a steady state of leakage and depletion allowing for continual saturation of seals (Kontorovich, 1984).

As long ago as 1933, geochemical surveys proved that major oil deposits allowed direct leakage of hydrocarbons to the surface.

With the advent of advanced analytical techniques, it appears that 70% or more of all known reserves have a definable hydrocarbon anomaly (Jones, 1984).

II. Natural zeolites (clay minerals in reservoir seal) act as catalytic cracking agents breaking long hydrocarbon chains into smaller molecules. This cracking action results in the negative ionization of the saturated zones along the general chemical reaction of:

$C_4H^-_{10}$ + catalyst-2 $C_2H_5^-$

secondary reactions allow for:

$2\,C_2H_5^- + H_2 \sim C_2H_6 + 2e^-$

Repeated experiments by the author and Pirson have shown that when shale cuttings are immersed in crude oil a negative charge (reduction) is generated (Pirson, 1981). This cracking process moves through several stages of varying reactions and rates until the operation stops and the shale returns to its normal oxidized state.

If fresh oil is re-injected, replacing that previously

cracked, the reaction begins anew. In the deep subsurface, free oxygen is in short supply, and the generated ionization potential is not strong enough to break down water molecules thereby liberating O_2. Therefore the total seal area is saturated with a non-reducible charge.

Field confirmation of these reactions comes from ion measurements gained through advanced mud logging techniques.

These "ion logs confirm that most if not all oil and gas reservoirs are enveloped in a zone of negative charge. This reducing environment has been found extending from 25-500 ft above the oil reservoir and 5-10 ft below the pay envelope" surrounding the pay zones (Fig. 1).

Neither the structural nature of the trap nor its sealant lithology seem to play a major role in this enveloping cathode development. Data were collected from numerous wells located across the U.S. and Canada (English, personal communique) .

III. The near surface (0-2,000 ft) environment is strongly oxidized due to the steady influx of free O_2 and carbolic acid.

With the near surface being oxidized (forming an anode), a column of electrical flow is established from the electron generating oil reservoir (the cathode) directly to the electron poor surface (Fig. 1). This flow, following the path of least resistance, forms a reduction environment column or chimney centered directly over the field. The chimney is referred to as a "redox cell" (Pirson, 1981).

Pirson thoroughly documented these giant earth batteries through the use of electric logs and surface redox potential (Eh) measurements. Field studies by Parker not only provide additional evidence that all oil fields generate redox cells but also that cell activity ceases and dies when the reservoir is depleted (Parker, personal communique).

Depletion of the oil allows for reversal of hydrostatic pressures creating reversed flow downward from the seal into the reservoir. This action effectively kills the cracking reactions and the cell activity greatly diminishes.

IV. Electrical flow from the redox cell creates a near surface low or Eh reducing environment. This type of reducing situation is not the norm for sedimentary rocks but is found in association with oil fields, some fracture zones, and certain saline water interfaces (Fisher, 1986; Campbell, 1977).

Consequently, the redox cell stands out as a brown blemish on the white plain of oxidation. It is this contrast of oxidized versus reduced environments, and their associated interaction, that generates various types of measurable geochemical phenomena.

V. Although numerous types of chemical reactions occur near surface, there are basically four types of phenomena existing relative to oil fields: (A) direct leakage, (B) surface ion movement, (C) reduction mineralization, and (D) direct electro-magnetic force (emf) measurements.

A) Direct leakage

Leakage detection has been used for more than 100 years to locate oil fields. Since most of the tar traps, paraffin deposits, and oil seeps have been drilled, modern direct leakage technology has moved into the area of advanced geochemistry in its various forms.

Microseepage hydrocarbon anomalies generally surround most oil and gas fields.

As stated before, microfracturing of the seals allows for a steady leakage of hydrocarbons to the surface. As they pass through the seal, cracking occurs leaving the broken hydrocarbon chains with a residual negative charge in a negative environment. This causes the upwardly mobile molecules to alter their course and move away from the redox cell.

This upward and outward motion creates an inverted cone configuration that gives the halo type patterns surrounding most fields (Fig. 1). The intensity of the cell voltage, hydrocarbon type, field density, fracture joint configuration, and other variables will determine leakage patterns.

B) Surface ion movement

Ion movement is probably the biggest single activity of the near surface relative to redox cells. Positive ions such as U02, ThO2, Ca, S02, Fe, FeO, I, K, Ni, Cu, and Zn will move to various redox cell locations relative to their ionic nature, the strength of the cell charges, and the geomorphic makeup of the near surface rocks.

Positive ions located outside the redox area migrate like spokes of a wheel inwardly until they reach a lower Eh potential, which causes precipitation and/or crystallization.

Low Eh levels capable of causing chemical deposition are normally found on the outer edges of redox cells, thereby creating zones of mineral concentration surrounding the oil field. This process constructs numerous types of DLT phenomenon such as radiation, metal, CaC02 (Delta C), iodine, and various other soil anomalies that appear as halos.

Gallagher reports the elements I, Br, Ni, Ca, P, V, Zn, Fe, Mn, Mg, Co, Cr, Sr, and a host of others to be concentrated (Fig. 9) in the halo areas (Gallagher, 1984) .

Radioactive elements such as uranium and thorium are also concentrated in halos. Variations in size and symmetry may be influenced by local ground water migrations.

Since the oxidized soil directly overlying the redox cell is most affected, a strong downward leaching action occurs. In some cases the action is of significant strength to create surface tonal variations and vegetation altering mineralization.

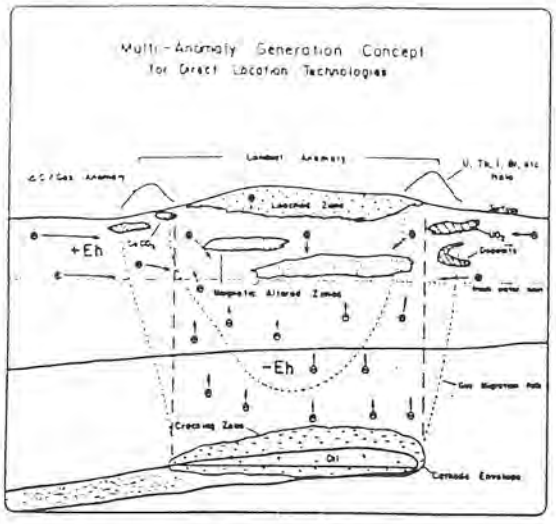
The easiest form of leach mineral zone identification is radiation survey. Many of the minerals involved are radioactive and can be used as "tracing" agents.

Laboratory soil analysis can also be used to trace ion, nickel, copper, zinc, and other metals, but this technique is slow and expensive relative to radiometrics, which gives the same basic results.

C) Reduction mineralization

One of the most interesting aspects of redox cell activity is the formation of reduced (low Eh) minerals. Most mineral alteration occurs directly over the oil field and thereby provides detectable anomalies that conform generally to the field confinements. In response to cell activity, increased cementing occurs over the field, and consequently as erosion continues a pseudo-structure (Fig. 1) develops over the field in response to the hardened soils (Matthews, 1985). These non-structurally related surface features have been key indicators in past years for oil exploration and are used today with Landsat imagery to work selective trends.

A second and most promising aspect of secondary



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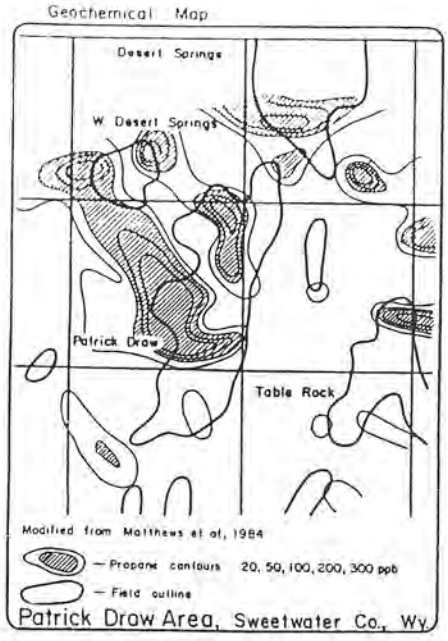

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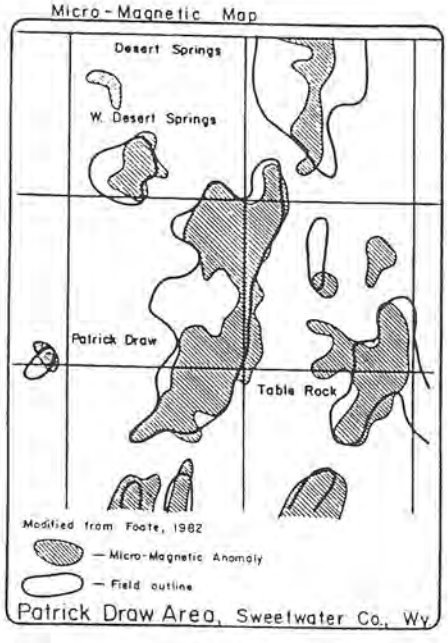

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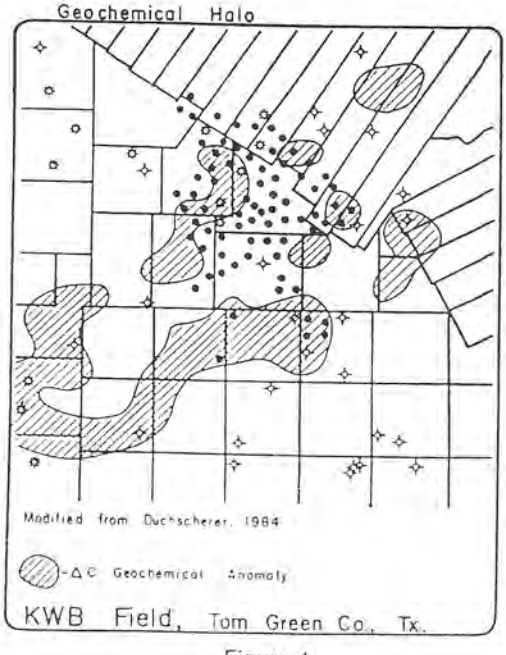

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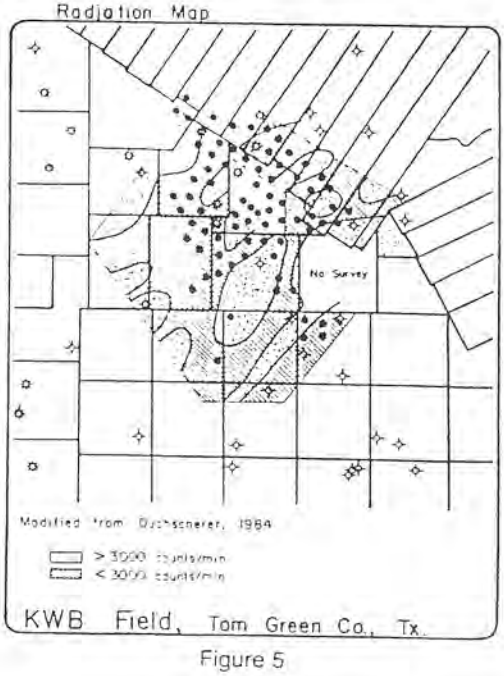

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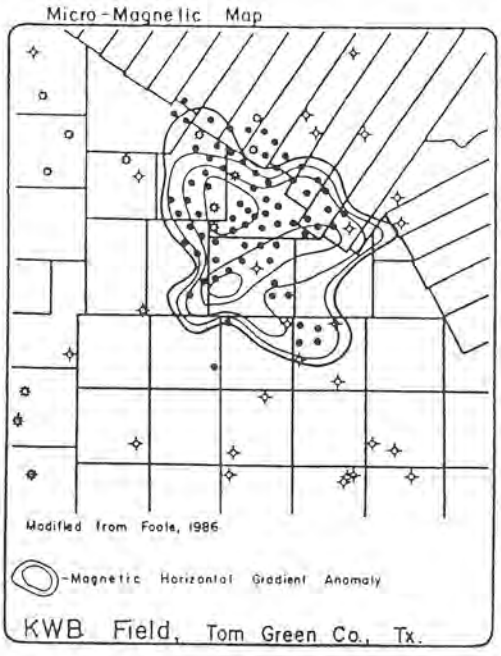

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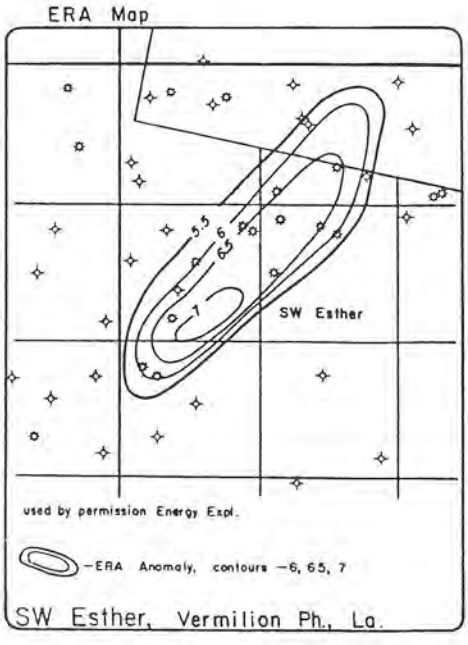

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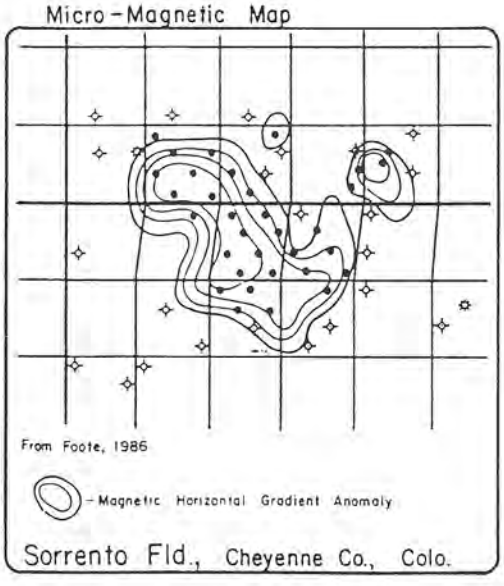

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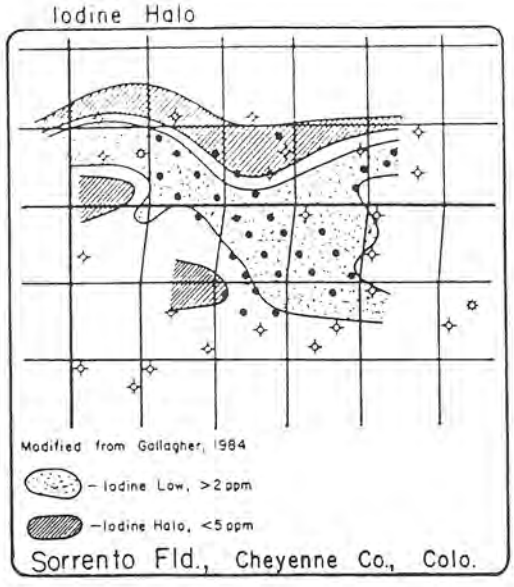

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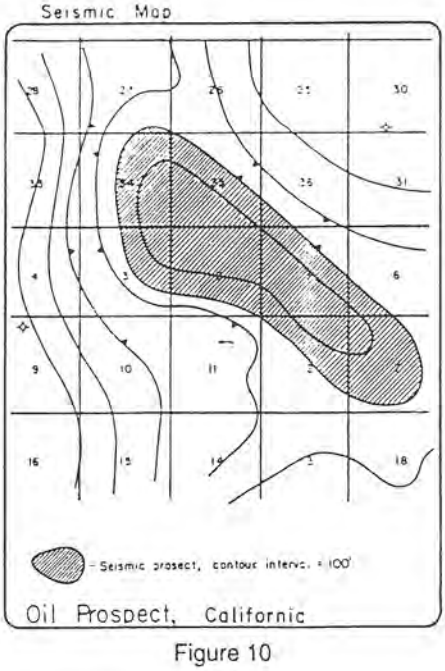

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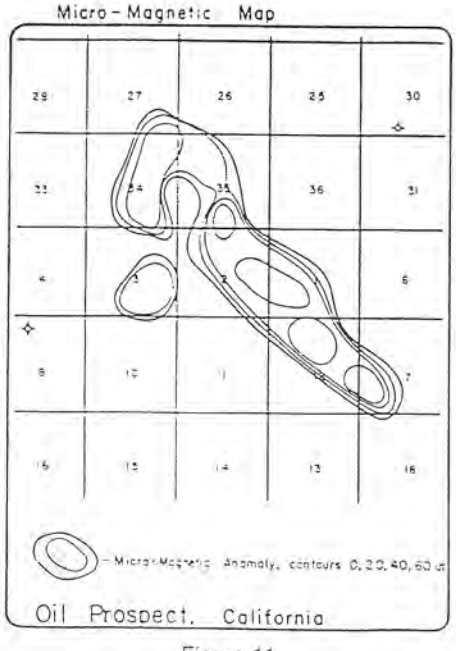

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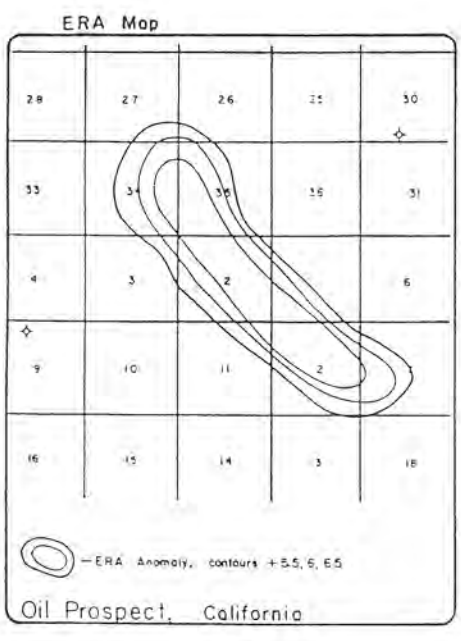

Figure 12

TRIASSIC REDBEDS, OVERLAIN BY BEACH SANDS, THEN SHALES, THEN LIMESTONES. WE CAN THEREFORE SAFELY SAY, IN GEOLOGIC PARLANCE, THERE GOES THE NEIGHBORHOOD.

Exploration Techniques Continued from Page 5

mineralization is the near surface formation of reduced altered zones containing magnetic iron and sulfide compounds (Sternberg et al., 1984; Foote, 1984). Normally, only iron minerals such as hematite and pyrite are formed and remain in the oxidized nearsurface; however, in a redox environment recrystallization occurs, producing magnetite, magnetic hematite, and the magnetic sulfide greigite (Foote, 1986). These compounds form only inside the cell, which proceeds vertically from the reservoir.

Detection can be made by either shallow core samples producing magnetic susceptibility logs or by airborne magnetic surveys, the latter (micro-magnetics) being the most cost effective (Foote, 1986).

These reduced altered zones can also be detected with some induced polarization methods (Sternberg et al., 1984) and the magnetic electrical tellurics of Pirson.

D) Direct EMF Measurements

Live-time measurement of redox cell activity must be viewed as the most fundamental of all DLTs, for it directly measures the life of the field. If it were not so extremely difficult, direct cell measurements would make most other tools obsolete.

At present only one tool, ERA, exists that can directly identify redox cell livetime activity, and no technical papers have been published to date (Parker).*Note: In the past year, a vastly improved, next-generation technology to ERA has been introduced under the name of Redox Identification Technology (RIT) (O&GJ July 26, 1993).*

DLT tools

Whether the oil field and its redox cell are detected by direct hydrocarbon detection, radiation or magnetic measurements, soil analysis, or erosional and tonal patterns, the same electrical chimney generates or controls the surface abnormalities.

The list of commonly accepted anomalies includes, but is not limited to:

A. Radiation, metal, calcium carbonate, iodine, and various other soil analysis phenomena and associated "halos".

B. Geochemical, Gas, and Delta C halo patterns.

C. Landsat, Tonal, Vegetation, and Erosional anomalies.

D. Induced Polarization phenomena.

E. Telluric and Magnetic Electrical Telluric patterns.

F. Earth Radiation Analysis anomalies (RIT Anomalies)

G. Micro-Magnetic anomalies

H. Radon and Helium anomalies

Of the generally accepted tools, a handful work remarkably well on a regular basis and should be considered before drilling any prospect. The selection of technologies will depend on locality, pocketbook, and lead time. Of all the technologies studied, six were found relatively reliable. However, of these, two were found to give more precise drill site information, requiring division into two categories, General and Precision Drill Site Locators.

General locator

General locators provide phenomena that are normally found in the surface but can be related to oil fields when present, and or normally only associated with hydrocarbons but which must be pattern-interpreted to locate the general field area. This group includes:

A. Geochemistry is the oldest form of geophysics developed. It was oil seepage that encouraged Drake to drill the first oil well in the U.S., and again, it was hydrocarbon leakage that pointed the way to salt dome drilling along the Gulf Coast.

During the 1930s, Russian geologists racked up impressive 80% wildcat success ratios using early gas sniffers and "bugology," the detection of hydrocarbon eating microbes that proliferate in hydrocarbonous soils.

This "bugology," though a crude form of geochemistry, is being studied by at least one major company.

Modern geochemical surveys, with computer and instrumentation advancements, have moved far beyond these early attempts and can now detect hydrocarbon leakage in parts per billion. A typical anomaly will develop a broken ring or halo surrounding the oil-gas field (Figs. 1, 2).

However, this is not always the case because numerous fields develop anomalies of single and multiple outgassings updip from the reservoir and possible single gas "bubbles" directly over the field. Consequently, outgassing patterns cannot be used solely for drill site locations due to their irregular nature.

What a geochemical survey tells, though, is that hydrocarbons are present and possibly producible; this is an excellent tool for frontier areas.

Most geochemical surveys are done by either taking soil gas samples or soil samples and measuring through chromatographs the background hydrocarbon content. However, sampling can be done through radar detection of propane gas with results similar to ground surveys (Sandy, 1988) and additionally, Delta C surveys can also give data patterns equal to or better than standard geochemical testing.

Delta C (AC) analysis consists of measuring carbon dioxide produced through the thermal dissociation of carbonates taken from soil samples (Duchscherer, 1982).

Calcium carbonate cements are formed in response to the passage and oxidation of hydrocarbons over time. These surveys are considered paleoanomalies covering geologic time and therefore are not directly affected by recent leakage changes (Figs. 1, 4). *Note: Delta C surveys were credited with over 50 discoveries from the 1950's through 198S, and must be considered one of the most successful geochemical tools developed. However, due to the passing of William Duchscherer, the technology is no longer available.*

B. Magnetic electrical tellurics is the surface detection of redox cell current flow.

Using surface magnetometers, Pirson converts magnetic residual anomalies into electrical gradients corresponding to the cell discharges.

Herzfield reports a success of 86% on wildcat production predictions (Herzfeld, 1984). In general, the magnetic electrical telluric anomalies are greatly enlarged relative to production but are normally centered on the field.

In addition, Pirson's work attempts to determine the depth and configuration of the redox cell source (oil seal) through the interpretation of inferred electrical flow patterns. This appears to be one of the best attempts yet at predicting reservoir depth.

However, recent research by the author indicates these voltages to be extremely small *(1. nano Tesla)* and beyond the

resolution of the magnetometers used.

Rather than being actual current induced magnetic variances, these anomalies may be caused by near surface magnetic altered zones. Their proximity to the surface distorts the earth's normal background magnetics, thereby allowing detection by vector analysis (Fig. 1). But despite the cause, magnetic electrical tellurics is an excellent tool when used in combination with others. *Note: This technology is currently available through Independex, Inc.*

C. Landsat and high altitude photography are advanced forms of surface geology; geomorphology, one of the most fundamental tools of the trade.

However, photogeology does have a few advantages over its century old predecessor. Surface photography can rapidly cover large areas revealing tonal, vegetation, drainage, and outcropping patterns; all are indicators for actual or pseudo-structural anomalies.

Drilling successes range from 28-77% depending on the area, with some locales yielding worthless results (Saunders, 1984). These high flying pictorials tend to work best in areas of moderate erosion and can be used successfully on both structural and stratigraphic traps.

The cost is the lowest per mile of any tool with high altitude photography being limited to the United States. Landsat provides world coverage.

D. Radiometrics can be described as the "Reader's Digest" version of geochemical analysis. Done properly, it can give an on-site general overview of soil leaching, mineralization halos, and helium outgassing that closely matches lab analysis of soil and gas samples (Figs. 1, 5).

Radiometric surveys measure relative soil containment of the various radioactive components such as uranium, thallium, radon, bismuth, and thorium, all of which form soluble compounds and migrate relative to electrical conditions.

Therefore, an area that has been leached downward due to redox cell activity will not only be deficient of Fe^{-} but also of $UO2^{-}$.

Areas such as mineral halos will not only have an overabundance of iodine and calcium carbonate, but will also concentrate thallium and thorium due to their ionization energy and solubility.

Areas surrounding oil fields have long been known for concentrations of uranium deposits (Fisher, 1986). The former Sun Oil reported correlations between production and radioactive lows of 50% (Weart et al., 1981).

Precision locators

Precision drill site locators are the newest forms of DLTs and have to be considered the next step in direct hydrocarbon location.

They have a distinct advantage over general locators being that they are direct redox cell identifiers and typically display anomalies that fit the field configuration. Some tools such as radiometrics and magnetic electrical tellurics form anomalies over the fields but are too confused to give drill sites. The best of the precision locators are:

A. Micromagnetics (magnetic horizontal gradient anomaly) is a relatively new tool detecting near surface secondary diagenetic magnetite/maghematite mineralization related to deeper oil and gas reservoirs (Figs. 1, 3, 6, 8, 1 1).

As stated previously, altered zones of reduced mineralization have been found directly over oil fields taking on the general outline of the fields. These zones can most easily be detected from air- borne magnetic surveys.

To confirm that (1) near-surface altered zones existed and that they (2) corresponded with field locations and (3) also matched airborne generated anomalies, more than 1,600 shallow magnetic susceptibility logs were produced over and around oil fields. The results confirmed that magnetic altered zones exist over almost all oil fields and, for the most part, did not exist in areas known to be dry.

Correlation between measured altered zone anomalies and airborne magnetics resulted in a 90% plus match, indicating the magnetic surveys to be extremely accurate. Field testing to date has shown 84% accuracy on production picks (Foote, personal communique). *Note: Most contractors offering Micro-Magnetic surveys have had marginal results, with some as low as 10% accuracy. The above referenced Magnetic Horizontal Gradient Anomaly technology is now referred to as Residual Sedimentary Magnetics (SRM) and must not be confused with standard Micro-Magnetics. The technologies are similar in data collection processes only and not in the final results.*

B. Earth radiation analysis (ERA) is a direct redox cell locator using radiation detectors to measure Radon outgassing rates (Figs. 7,12).

Radon is one of several gases produced and exhaled by the soil. Although radon is just one of many gases migrating into the atmosphere, it is one of the few that is in fair abundance and also radioactive, thereby making it easy to identify and measure.

Specific radon outgassing rates and patterns are produced in a live-time sequence relative to redox cell activity. Production estimates average 50%, with dry hole picks being in the high 90 percentile range.

Being a live-time cell indicator allows the ERA system to work over depleted production revealing deeper untapped pays. Cell activity diminishes as production pressures drop, with old fields showing little activity (Parker). *Note: ERA surveys were included in the Gerry Calhoun's GERT study of remote sensing technologies (O&GJ May 13, 1991). The ERA technology was carried under the name of "Windowed Radiometrics" and had an impressive 83% success ratio. A more advanced version of the ERA has been berthed in the last year under the name of Redox Identification Technology (RIT) (O&GJ July 26, 1993).*

Exploration economics

Direct location tools are not panaceas that will solve all the oilman's problems over night. They are technical advancements that can give a tremendous edge in the risky exploration business.

Many assume that by moving to the use of DLTs that the proven tools of classic exploration are thrown out, but nothing could be further from the truth.

In fact, DLTs allow for the optimum use of existent technology. Since DLTs give extremely accurate answers relative to no drill situations, they can be used as a rapid, cheap submittal checking device that will eliminate dry prospects prior to large expenditures.

The single greatest advantage of DLT exploration is the ability to increase wildcat success ratios from an industry average of 1 in 8 to 1 in 3.

The average company with its 13% success rate spends $16-22/bbl of oil in finding and development costs.

When the success ratio is moved to 35% in a standard

industry environment, cost drops to $5-7/bbl. However, this is an extremely rare situation and normally only occurs in new trend development.

When DLTs are added to an exploration program, finding and development costs should be reduced even if success ratios don't change. This is due to the reduced acreage and seismic expenses and the actual size of a prospect, thereby rejecting small reservoir plays.

All of this adds together to immediately drop the cost to approximately $8-10/bbl. And again with a DLT program, the expected success ratio is 35%, not the industry standard 13%.

Consequently, the normal finding and development cost should be $3- 5/bbl.

A Midland company using the DLT approach in 1 year raised its rank wildcat discovery percentage to 29% from 8% and lowered its total costs to $3.59/bbl.

Conclusion

With proper use, DLTs offer major technical advances.

One who chooses to pursue this advanced path must not cut corners. The tools are relatively cheap, not free.

One of the biggest mistakes made by independents is the misconception that they can skimp on DLT in the same manner that they skimped on seismic.

Single line geochemical profiles, although cheap, will not substitute for a detailed grid survey.

In addition, one must be careful as to whom they use for DLT work. No industry standards exist as with electric logs and seismic, and many former house painters have been known to do radiometric surveys, thereby giving everyone in the trade a bad name.

However, if one will expend the time and money to do the job properly, great rewards can be had from DLT.

For a list of references, contact the author at 4703 Cypressdale, Spring, Tex. 77388. (713) 350-0960

REED TOMPKINS-Biographical Sketch

Reed Tompkins is a developer of redox cell telluric technology and has made several advancements in the direct detection of these currents. His 16 years experience have involved him in exploration programs in the Gulf Coast, California, Rocky Mountains, Mid-Continent, Egypt, and Israel, where he was instrumental in drilling the deepest Middle East well to 21,500 ft. He holds a BS degree in geology from Texas A & M University.

Recent Reference

Tompkins, Reed, 1993, "Redox Identification Technology..." Oil & Gas Journal, Sept. 26, 1993.

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Left to Right: Russell Davis, University of Mississippi; Ethan Reese-Whiting, University of Southern Mississippi; Margaret Mariarz, Millsaps College; Steve Dudley, Mississippi State University.

PRESIDENT'S LETTER

There will be no President's letter this month as the flu has grabbed Brian and won't let go.

It is not too late to renew last year's Bulletin ad or to take out a new one. Please call Brian.

The nominating process for GCAGS awards is open until February 28. The categories are Honorary Membership, Distinguished Service and Outstanding Educator. See Brian or Neal for information and forms.

Stan Thieling

Where did all the Chalk Faults Go?

by George B. Vockroth

Pattern Recognition when correlating electric logs in the chalk often shows missing (patterns) section. This is generally attributed to normal faulting (cut out section) in the Gulf coast. In (oil) fields and where well control is abundant these "chalk" faults cannot be tied to faulting up and down a fault plane as in the Wilcox and eutaw.

George Vockroth received a B.S. in Engineering Geology from VIP, and an A.M. in Geology from Harvard. He retired after twenty six years with Chevron in 1977 and opened Vantage Oil. He is an "Adjunct Professor" of Geology at Millsaps and is famous for his geology courses at Jackson State University. He is a member of SPE, SPWLA, AAPG, AIPG, SIPES, MAPL, D & D, and MGS.

NO, LEONARD, IF YOU CAN WIPE IT OFF YOUR BOOT IT PROBABLY ISN'T A COPROLITE JUST YET !

by Shelly H. Fischman

BUSINESS MEETING LUNCHEON

11:30 A.M. FEBRUARY 8, 1994

Capitol City Petroleum Club, Smackover Room

George B. Vockroth - Speaker Vantage Oil

BUSINESS MEETING LUNCHEON SCHEDULE

February 8, 1994
March 8, 1994
April 12, 1994
May 10, 1994

SPRING FLING
May, 1994

Mississippi Geological Society – 1993-1994

BOARD OF DIRECTORS

Brian Sims, President (352-7736) ..... Independent
Neil Barnes, 1st Vice President (353-9056) ..... Independent
Lars Johnson, 2nd Vice President (977-5424) ..... Bureau of Land Management
John Warner, Treasurer (961-5265) ..... Office of Land and Water
Roger Bergeron, Secretary (992-1104) ..... Location Sample Service
Stanley King, Past President (352-4458) ..... Independent

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AAGP ..... Gerald Kinsley (94)
AAPG ..... Dave Cate (93)
AAPG ..... Rick Ericksen (95)
AAPG ..... Alternate - Dave Chastain (95)

HONORARY MEMBERS

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Paul Applin *
Lawrence F. Boland*
Verne L. Culbertson
H. Leroy Francis*
David C. Harrell
Oleta R. Harrell*
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Emil Monsour
William H. Moore
Marvin E. Norman
Richard R. Priddy*
Thurston Connell Rader
Baxter Smith*
Henry Toler*
*Deceased

BY-LAWS OF THE MISSISSIPPI GEOLOGICAL SOCIETY, INC.

THE MISSISSIPPI GEOLOGICAL SOCIETY, INC.

ARTICLE I - NAME AND AFFILIATION

The name of the Society shall be 'The Mississippi Geological Society, Inc." It shall be affiliated with the American Association of Petroleum Geologists.

ARTICLE II - OBJECTIVES

The objects of this Society are: (1) the stimulation of interest in geology and related sciences; (2) the encouragement of scientific research among members; (3) the promotion of social and professional fellowship among members; (4) the dissemination and discussion of geological information; and (5) the Society shall not be operated for profit and no financial benefits of any nature shall ever accrue to the members thereof.

ARTICLE III - MEMBERSHIP

Section I: The membership of this organization shall be made up of active members, associate members, and honorary members.

Section II: In order to be eligible for active membership, an applicant shall: (1) have a degree in geology or an allied science from a recognized college or university and shall be directly engaged in the application of geology, or shall (2) have been primarily engaged in geological work during at least the preceding five years. These requirements shall not apply to any charter member of the Society as reflected by the June 16, 1940 membership list.

Section III: Any person shall be eligible to associate membership who is actively engaged in geological or related work. Junior, senior, and graduate level geology students in a recognized university or college shall also be eligible to associate membership.

Section IV: Honorary Members. The Board of Directors may from time to time elect, by unanimous vote of the Board, as honorary members of the Mississippi Geological Society, Inc. persons who are present or past members and have contributed distinguished services to the Society. It is not

BY-LAWS Continued from Page 3

Inc. persons who are present or past members and have contributed distinguished services to the Society. It is not intended or desirable that there should be a large or promiscuous number of such members, but that it should be considered an honor to receive from the Society an honorary membership as a token award in appreciation and esteem for meritorious services. Honorary members shall not be required to pay dues and may enjoy all privileges of the Society.

Section V: Any member may be suspended or dropped from the membership of the Society for misconduct or actions harmful to the Society; action to be taken at the discretion of the Board of Directors by a majority vote of the Board. Such charges shall be made in writing to the member, who may protest such charges within 30 days from the date which they were mailed. After the 30 days have expired, the Board of Directors may expel such member by a majority vote of the Board. The member may resign before the end of the 30 days, at which time the foregoing proceedings shall automatically terminate.

ARTICLE IV - OFFICERS AND BOARD OF DIRECTORS

Section I: Officers shall be a President, a First Vice President, a second Vice President, a Treasurer, and a Secretary. These, together with the past President shall constitute the Board of Directors. If the past President for any reason shall be unable to serve as a member of the Board of Directors, the President shall fill the vacancy by the appointment of the next available preceding past President. No officer shall succeed themself in office, with the exception of the First Vice President who after having succeeded to the Presidency due to a vacancy in that office, may upon election, serve a full term as President.

Section II: The duties of the President shall be to preside at all meetings, maintain order, call special meetings subject to the approval of the Board of Directors, appoint all committees, and shall delegate members to represent the Society. The President may serve on any committee. The President, together with the Treasurer, shall sign all checks, drafts, contracts, and all other obligations of the Society. In the temporary absence of any other officer of the Society, the President shall have the power to appoint a member to assume duties pro tempore.

Section III (a): The First Vice President shall assume the office and responsibilities of the President in case of a vacancy, absence, or disability of the President. The First Vice President shall automatically assume the office of President for the term succeeding their year as First Vice President. The First Vice President shall be at the disposal of the President for any duty necessary to the proper functioning of the Society. Upon election, the First Vice President of the

BY-LAWS Continued from Page 4

(b): The Second Vice President shall be responsible for the maintenance and supervision of the various publications of the Society. The Second Vice President shall organize the necessary committees to properly administer the maintenance and revision of all publications of geologic interest.

Section IV: The Treasurer shall assume the duties of the President in case of the temporary absence of both the President and First Vice President. The Treasurer, together with the President, shall have charge of the financial affairs of the Society. The Treasurer shall submit an annual report and inventory at the last meeting before the summer recess, and any other special reports upon the request of the President. He shall receive and disburse all monies; however, expenditures in excess of one hundred dollars shall be made only with the approval of the Board of Directors. During the month of September, the Treasurer shall send statements or notices of dues to all members, except honorary members .

Section V: The Secretary shall assume the duties of the President in case of the temporary absence of all the other officers, except the Second Vice President. It shall be the duty of the Secretary to fully and permanently record the minutes of all the meetings of the Society and all meetings of the Board of Directors. The .Secretary shall prepare and distribute by mail not later than January 15 a membership list and a list of committee assignments. It shall be the Secretary's duty to have at every meeting a copy of the By-laws with all amendments thereto. The Secretary shall be responsible for all secretarial duties connected with affairs of the Society. The Secretary shall prepare all ballots and papers necessary to any Society election.

Section VI: In addition to their other duties, the Board of Directors shall made or cause to be made an annual check and review of the Society's records prior to the last meeting of the year.

ARTICLE V - ELECTIONS

Section I: General Elections

A. Nominating Committee. A Nominating Committee composed of five (5) members shall be appointed by the Board of Directors 30 days before the first regular meeting in April. The Chairperson of the Nominating Committee shall be the immediate past President, or, if unable to serve, the next available past President. No incumbent officer shall serve on this Committee. The Committee shall be discharged after presenting its slate of candidates to the Society.

B. Nominations: Nominations for officers of the Society shall be made by the Nominating Committee and a slate of candidates announced at the first regular meeting in April. Two or more candidates shall be nominated for each office by the Committee. Additional candidates for each office may be nominated from the floor at this meeting or at the last regular meeting in April. A biographical sketch of each candidate shall be published and mailed to each member of the Society at least two weeks prior to the election, or given verbally at the regular meeting just prior to the election.

C. Voting: Election of officers shall be held each year at the last regular meeting of the Society before the summer recess. Voting shall be conducted by secret ballots prepared in advance by the Secretary. A majority vote of the members present at voting shall decide the election. If more than two candidates run, and no candidate receives a majority vote (greater than 50%) on the first ballot, the candidate with the least number of votes shall be stricken from the ballot and another poll taken. This procedure shall be continued until a candidate receives a majority vote. Any member who cannot be present at the election meeting may upon request obtain an absentee ballot from the Secretary of the Society. The Secretary shall deliver all sealed ballots to the election Judges at the election meeting. Only paid-up members and Honorary Members shall be eligible to vote in any election.

Section II: Special Elections

A. A special election shall be held at the next meeting subsequent to the permanent vacancy of any office excepting the President. The sole purpose of such special election shall be to fill the vacated office, or offices. Prior written notice to the membership will be given regarding the special election.

B. The Board of Directors shall appoint a Nominating Committee composed of five (5) members who shall elect two or more candidates for the office to be filled. The Chairperson of the Nominating Committee shall be the Immediate Past President, or if unable to serve, the next available Past President. No incumbent officer shall serve on this Committee. Nominations may also be made from the floor. The Committee shall be discharged after presenting its slate of candidates to the Society.

C. Voting: Nominating and election of officers shall be held at the same meeting of the Society. Voting shall be conducted by secret ballots. A majority vote of the members present and voting shall decide the election. If two or more candidates run, and no candidate receives a majority vote (greater than 50%) on the first ballot, the candidate with the least number of votes shall be stricken from the ballot and another poll taken. This procedure shall be continued until a candidate receives a majority vote.

Section III: Election Judges

Prior to the balloting of any election, the President shall appoint three (3) Election Judges from the membership who are not incumbent officers or candidates for any office of the Society. These Judges are charged with the secret counting of the ballots and announcing the names of those elected. Election Judges will be appointed for each election.

ARTICLE VI - BOARD OF DIRECTORS

The Board of Directors, in addition to its duties specified in the Constitution, shall meet at least monthly throughout the entire calendar year and shall be the governing body of the Society. A quorum of this Board shall consist of a minimum of four (4) members. To conduct business, a majority vote of those present is necessary.

ARTICLE VII - STANDING COMMITTEES

As soon as practicable after taking office, the President shall

MY FAIR TRACHODON

Shelly H. Fischman is a syndicated cartoonist (political and general humor) who is a member of The American Association of Editorial Cartoonists. He has been a consulting cartoonist and illustrator/contributing cartoonist and has been published widely, including such publications as The Washington Post; The Chicago Tribune; The Washington Times; Science 86; Bioscience; New Scientist; Policy Review, Washington, D.C.; Geotimes; Journal of Geological Education and Foreign Service Journal, Washington, D.C. We thank him for providing these cartoons through Lars Johnson.

BY-LAWS Continued from Page 5

appoint the Chairpersons of six (6) standing committees. Chairpersons shall appoint the Committee Membership as needed. Committees shall be as follows:

A. A.A.P.G. Committee B. Entertainment Committee C. Field Trip Committee D. Program Committee E. Projection Committee F. Publicity Committee

A. The A.A.P.G. Committee shall coordinate the efforts and activities of the Mississippi Geological Society, Inc. with the American Association of Petroleum Geologists. If any member or members of this Society is a District Representative or holds a National Office in the A.A.P.G., such member or members shall automatically serve on this committee.

B. The Entertainment Committee shall provide a suitable place for each meeting of the Society. If a luncheon or dinner is served in connection with the meeting, this Committee shall make all necessary arrangements including reservations. This Committee shall plan and coordinate any other social function of the Society.

C. The Field Trip Committee shall make and supervise the general plans of field trips which may be held from time to time at the discretion of the Society. This Committee shall avail themselves of the services of any other committee or member of the Society whenever it is deemed necessary.

D. The Program Committee shall secure speakers and lecturers to present topics of interest to the Society, shall make all necessary arrangements for presentation, and this Committee shall notify sufficiently in advance all other Committees whose services will be required to implement the meeting.

E. The Projection Committee shall provide and operate all projection and sound equipment necessary to any presentation before the Society.

F. The Publicity Committee, upon notification by the Chairperson of the Program Committee, shall prepare and distribute in advance to all members notice of meetings. This Committee shall, as soon as practicable, contact all new geologists in this area who are eligible for membership in the Society. This Committee shall secure as much favorable publicity as possible for the Society and the profession of geology.

ARTICLE VIII - SPECIAL COMMITTEES

The President shall appoint the Chairpersons of Special Committees and, after consultation with these Chairpersons, shall appoint the membership thereof. These special committees shall specifically include those with technical assignments designed to further the objectives of this Society as stated in Article II of the Constitution.

ARTICLE IX - DUES AND ASSESSMENTS

The annual dues of Active and Associate Members shall be payable on or before October 1st. Dues are to be determined by the Board of Directors. The fiscal year of the Society shall be from June 1st through May 31st.

Special assessments may be levied at any meetings by a majority vote of the members present, provided advance notice of the proposed assessments has been made to all members of the Society by mail.

Members who are in arrears in dues and/or special assessments on January 1st shall be dropped from the list of members. Any former member may be reinstated by payment of any outstanding dues and obligations which were incurred prior to the date when they ceased to be a member of the Society, and by payments of dues for the fiscal year in which they request reinstatement.

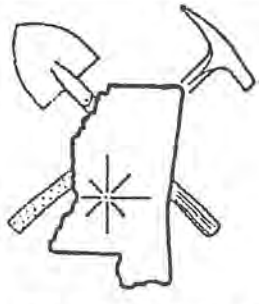
ARTICLE X - MEETINGS

A. Regular Meetings: Regular meetings shall be held each month from October to May, inclusive. Regular meeting dates may be changed or canceled at the discretion of the Board of Directors.

B. Special Meetings: Special meetings may be called from time to time to conduct business or for any other purpose deemed advisable by the Board of Directors, due notice having been given in advance.

ARTICLE XI - AMENDMENTS

Amendments to the Bylaws may be made by a two-thirds majority of the votes cast by mailed ballots, to be supplied and mailed by the Society to the membership, provided a motion to amend said Bylaws has been passed at regular business meeting by a majority of the members present at said meeting. Returned ballots must be postmarked within 30 days of the mail-out day in order to be counted.



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Jackson, MS

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P.O. Box 422, Jackson, Mississippi 39205-0422

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Please complete and return this card with your annual dues ($20.00) ($5.00 student) to the above address. I hereby make application for:

New ☐ Renewal ☐ membership in the Mississippi Geological Society.

No sponsors needed for a renewal membership.

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MISSISSIPPI GEOLOGICAL SOCIETY

VOLUME XLII NUMBER 7 MARCH 1994

DIRECTORY

Aspects of Deposition and Diagenesis of the Smackover Formation, Mississippi and Louisiana

by Ezat Heydari, Basin Research Institute, Louisiana State University, Baton Rouge, LA 70803

The Smackover Formation consists of two shoaling-upward cycles in Mississippi and Louisiana. The lower cycle is made up of a basal mudstone that grades upward into the ooid grainstone. The upper cycle is composed of peloid packstone that also grades upqward into an ooid grainstone. Accurate recognition of these facies is crucial in lithofacies correlation in basin analysis.

The mudstone member of the lower cycle is the facies which is commonly referred to as "the lower laminated member" or "the hydrocarbon source facies" of the Smackover Formation. Recent studies indicate that the mudstone consists of three distinct lithofacies: a basal laminated mudstone, a middle thin-bedded mudstone, and an upper burrowed mudstone. These mudstone facies and their geochemical signatures are correlatable over 500 km from eastern Mississippi to western Louisiana. Studies also suggest that deposition of organic-rich lime mud was controlled by extreme fluctuations in climate.

The ooid grainstones of the lower cycle deposited as a sheet on the Smackover carbonate shelf. Ooid grainstones of the upper cycle formed ooid shoal barriers seaward of the lower cycle ooids and prograded rapidly basinward. The ooids of the two cycles show climatically controlled predictable variations in original mineralogy.

During burial but prior to the arrival of hydrocarbons, diagenesis of the Smackover Formation was dominated by precipitation of calcite, dolomite, and anhydrite. Further burial after hydrocarbon migration resulted in thermochemical reduction of reservoir sulfates and production of significantaamounts of elemental sulfur and hydrogen sulfide. Reaction of elemental sulfur with liquid and gaseous hydrocarbons caused total destruction of the Smackover hydrocarbons in deeper parts of the basins.

VITA: Ezat received his B.S. degree from the Department of Geology of the University of Tehran in 1976. He attendend Pennsylvania State University in the Spring of 1978a dn completed his M.S. degree in the Fall of 1981. His thesis included structural geology and Cenozoic stratigraphy of the Resting Spring Range in the Death Valley region, California. He entered the doctoral program at Louisiana State University in 1981 and graduated in May of 1990. His dissertation research included diagenesis and geochemistry of the late Jurassic Smackover Formation in the Mississippi salt basin. During two years of post-doctoral research, he studied paleoceanographic and paleoclimatic controls on deposition of Smackover reservoir rocks in Mississippi and Louisiana. He is presently a research associate with teh Basin Research Institute at Louisiana State University. His current research project includes petrography and diagenesis of Mesozoic-Cenozoic siliciclastic and carbonate strata of Louisiana.

PRESIDENT'S LETTER

There is no President's Letter available this month.

Marvin E. Norman - Mississippi Geological Society Honorary Life Member

Marvin Eugene Norman, 86, of Laurel and Gulfport, Mississippi, passed away in Houston, Texas, on Wednesday, January 26, 1994.

Mr. Norman was born on November 5, 1907, in White Settlement, Texas. He attended the Fort Worth, Texas public schools and attended Texas Christian University where he was awarded Bachelor of Science and Master of Science degrees. He was active in sports at TCU having lettered in track an golf, and was a member of the "Big 10". He was an active member of the TCU Alumni Association and the Quint Club.

In 1929, Mr. Norman was employed by the Gulf Oil Company in Meridian, as a geologist and petroleum engineer. Between 1941 and 1964, Mr. Norman resided in Jackson, and Dallas, Texas where he was an independent geologist and petroleum engineer. In 1964, he moved to Laurel, where he was associated with the Brandon Company and later the Mississippi-Florida Corp. of Amerada-Hess, where he served as president. He was a pioneer in the oil and gas industry in Mississippi having discovered, among others, the Heidelberg Field located in Jasper County . He was one of the initial inductees in the Mississippi Oilmen's Hall of Fame and remained active in his profession until his death.

Mr. Norman was a Methodist, having been a member of the First Methodist Church of Laurel and Trinity Methodist church in Gulfport. He was a life member of the Laurel Rotary Club. Professionally, he was a member of the American Association of Petroleum Geologists, American Petroleum Institute, Mississippi Geological Society and other professional organizations.

In 1934, he married the former Allene Elizabeth Allen of Fort Worth, Texas, who preceded him in death. He is the father of Marvin Eugene Norman, Jr. of Houston, Texas, Jackson Allen Norman, deceased, and Dixie Norman Boyd of Gulfport, Mississippi. He has eleven grandchildren and four great-grandchildren.

Mr. Norman was the son of Jackson G. Norman and Lena Turner Norman and the brother of J.G. Norman,Jr., Worth Norman, Noble Norman, Grace N. Covey , and Laura N. Moore. He is survived by his sisters Bess N. Rollins and Evelyn N. Thompson

The family has requested that donations be made to the M.E. "Bud" Norman Memorial Fund at Texas Christian University in care of TCU Donor Relations, P.O. Box 32920, Fort Worth, Texas 76129, or your favorite charity

Funeral services were held at the Mt. Olivet Cemetery in Fort Worth, Texas on Saturday, January 29, 1994, and a memorial service was held at the First Methodist Church in Laurel, Mississippi on February 19, 1994.

modified from the Jackson *Clarion Ledger*

BUSINESS MEETING LUNCHEON

11:30 A.M. MARCH 8, 1994

Capitol City Petroleum Club,

Smackover Room

Ezat Heydari - Speaker

Basin Research Institute, LSU

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*Deceased

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601/948-4370
TULSA/PET GEOL/BS
1910 CATALINA DR
JACKSON, MS 39204
601/372-8493

BRADLEY, JOE C
BRUXOIL
PO BOX 16929
JACKSON, MS 39236
601/981-5722
LSU/GEOL/BS
100 WREN PLACE
BRANDON, MS 39042
601/992-9908

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HIGH STAR O&G EXPL CO
6440 HILLCROFT,SUITE 116
HOUSTON, TEXAS 77081-3104
3015 REDWOOD LODGE DR.
KINGWOOD ,TEXAS 77339-2400
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MID WSTRN ST UNIV-PENN
ST/GEOL/BS-MS
713/358-2343

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601/981-5722
1717 BELLEWOOD RD.
JACKSON, MS 39211
601/362-4022

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UNIVERSITY, MS 38677
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980 HARLAN DR.
OXFORD, MS 38655
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BULL, STRATTON H
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DIRECTORY *Continued from Page 4*

BURCHFIELD, GEORGE E
2100 RIDGEWOOD DR
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601/736-7043
MILLSAPS-MISS ST/GEOL/BS-MS

BUSH, JOHN D
PARAMOUNT PETROLEUM
111 E CAPITOL ST, STE 240
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RIDGELAND, MS. 39157
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217 W CAPITOL ST, STE 201
JACKSON, MS 39201
601/948-5279
UNIV OF AR/GEOL/BS-MS
105 WOODGLEN PL
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3102 TIDEWATER LANE
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DICKERSON, ROGER L.
5125 OLD CANTON ROAD
JACKSON, MS. 39211

DOUGLAS, JAK M
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EXPLORATION CO
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USM-SMU/EARTH SCIENCE

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E N MEX/BS ECON/MA

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601/445-8022
LSU/PETR GEOL/BS
204 SOMERSET
NATCHEZ, MS 39120
601/442-1958

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JAMES B FURRH, JR, INC
1212 CAPITOL TWRS
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1015 JASPER COVE
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DIRECTORY Continued from Page 5

FULGHUM, HENRY L
257 VALLEY VISTA DRIVE
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HOUSTON-TX/GEOL/MA-BS

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GEOL

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STATE/GEOL/BS
265 HIGHPOINT DR
JACKSON, MS

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PLAZA
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UNIV OF TX/GEOL/BS
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TERRY, MS 39170
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7170 TANK ROAD
TERRY, MS 39170
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XX

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CENTENARY/GEOL/BS

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UNIV OF NM/GEOL/BS
601/366-7475

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MILLSAPS/GEOL/BS

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TEXAS TECH/PETR GEOL/BS
601/856-8066

HOLLINGSWORTH,
EDWARD "ED"
MOON & HINES
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JACKSON, MS 39201
601/944-4700
UNIV OF AL/GEOL/BS

HOLMAN, BERNARD A.
INDEPENDENT
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JACKSON, MS 39216

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135 OLD FANNIN RD
BRANDON, MISS 39042
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107 WILDWOOD CT
BRANDON, MISS 39042
601/992-0386

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INDEPENDENT
2140 E TEXAS STREET
BOSSIER CITY, LA 71111
318/742-7733
USM/GEOL/BS
318/747-6253

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2445 N CHERYL DRIVE
JACKSON, MS 39211
601/366-7144
TCU/GEOL/BA

HUGHES, DUDLEY
HUGHES-RAWLS
CORPORATION
SECURITY CENTER SOUTH,
STE 800
JACKSON, MS 39201
601/969-7474TX A&M/GEOL/BS
XX HONORARY LIFE MEMBER XX
4050 CRANE BOULEVARD
JACKSON, MS 39216
601/981-2246
TX A&M/GEOL/BS

JACKSON, ALAN
CONSULTING GEOLOGIST
503 MANDALAY DRIVE
HATTIESBURG, MS 39402
601/264-9755
LSU/GEOL/BS-MS

JACKSON, ROBERT L
R L JACKSON ASSOCIATES, INC
7127 BOB O LINK DRIVE
DALLAS, TX 75214
214/827-9822
ST LOUIS UNIV-UNIV OF
AZ/PETR GEOL

JACOBS, ROBERT ROSS
PO BOX 16263
JACKSON, MS 39236
601/362-4846
MICHIGAN ST/GEOL/BS

JAMES, LOUIS "MAX"
GULF COAST EXPLORATION CO, INC.
PO BOX 385
BAY SPRINGS, MS 39422
601/764-3738
LSU/GEOL
ROUTE 1, BOX 128
BAY SPRINGS, MS 39422
601/764-3738

JEFFREYS, E GEOFFREY
100 TOWER DRIVE, UNIT 1001
MOBILE, AL 36660
205/621-1850
CO SCHOOL OF MINES/GEOL

JENNINGS, STEPHEN P
117 BENTLEY DRIVE
BRANDON, MS 39042
601/825-4622
VA. POLY INST-KY/GEOL/BS

JENSEN, ERIC B.
SEISMIC OIL CO.
P.O. BOX 31158
JACKSON, MS 39206
601 362-5827
NOTRE DAME/GEOL.

JINKINS, RON
D & D EXPLORATION
PO BOX 1028
NATCHEZ, MS 39121
318/442-5820
UNIV OF AL/GEOL/MS
7 SUN COURT
NATCHEZ, MS 39120
601/445-9761

JOHNSON, LARS
570 LAKE CAVALIER ROAD
JACKSON, MS 39213
TX A&M/BS-MS

KARGES, HAROLD E
CONSULTANT
P.O. BOX 1635
JACKSON, MS 39215
601/352-0972
TCU/GEOL/BS

KATZENMEYER FREDRICK L
KATZ OIL CO.
PO BOX 665
NATCHEZ, MS 39121
601/446-6505
USM/GEOL/BS
601/446-7604

KAUFMANN, KARL J
VALIOSO PETROLEUM
106 SOUTN PRESIDENT ST.
JACKSON, MS 39201
601/352-3501
360 WICKLOW COVE
JACKSON, MS 39042
601/992-2027

KEBERT, DEAN
KEBERT ENERGY,INC.
234 E. CAPITOL ST. RM 302
JACKSON, MS. 39201
601 353-3761
9 DOGWOOD HILL DRIVE
JACKSON, MS. 39211
601 957-8511

KEMP, PETER E
2474 N CHERYL DR
JACKSON, MS 39211
601/362-0248
USM-TN/GEOL/BS-MS

KENDRICK, F "ED"
LOG ANALYST
5403 RIDGEWOOOD RD
JACKSON, MS 39211
601/977-5232
5403 RIDGEWOOD RD
JACKSON MS 39211
601/956-1783

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416 E AMITE, STE 103
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P O BOX 5181
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601/992-2328
MILLSAPS-MSU/GEOL/BA-BS

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L-100 B, CAPITAL TOWERS
JACKSON, MS 39201
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GEOL/BA-MA
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(GEOL-MATH)/MS/GEOL
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GEOL/BS-MS

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601 352-9808

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UNIV OF MO/GEOL/PHD

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LYBRAND, MIKE S
EOC SYSTENS
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4283 KIMBELL RD
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BATON ROUGE, LA 70817

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JACKSON, MS
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29 CEDAR LANE
NATCHEZ, MS 39120
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MILLSAPS/GEOL/BS
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MONSOUR, EMIL
360 COMET DRIVE, SUITE B
JACKSON, MS 39206
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XX HONORARY LIFE MEMBER XX
1448 DOUGLAS DRIVE
JACKSON, MS 39211
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XX HONORARY MEMBER XX

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OZONE PROBLEM? WHAT OZONE PROBLEM?

Cartoon by Shelley with permission

My publisher is printing two versions of my new book. For my quantitative-minded peers in the scientific community the title will be "Calculations of Quaternary Sea-Floor Spreading Rates Based on Mathematical Models Which Include Assumptions of Randomness, Normality and Variance of Sample Data Within the Limits of Statistical Error." The coffee table version will be called "Continents That Go Bump in the Night."

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PUBLICATION LIST

SPECIAL VOLUMES

1. Mississippi Geological Society Photo Directory, 1981 ..... $ 2.00
2. Wilcox Fields of Southwest Mississippi, Maps and production data on 171 fields, in ring binder, 350 pp., 1969 ..... 28.00

Mesozoic-Paleozoic Producing Areas of Mississippi and Alabama

3. Volume I. Maps and producing data on 57 fields, with 2 composite logs, clothbound, 139 pp., 1957 ..... (out of print)
4. Volume II. Maps and producing data on 77 fields, includes Supplement 1, in ring binder, 143 pp., 1963 ..... 15.00
5. Supplements 2 through 7 for Volume II, Maps and producing data on 35 fields, 110 pp 15.00
6. Supplement 8 for Volume II, Maps and producing data on 34 fields, 108 pp., 1980 ..... 25.00
7. Supplement 9 for Volume II, Maps and producing data on 19 fields, 82 pp 1992 (in printing) 25.00
8. Volume II complete with Supplements 2-9, 363 pp., 165 fields 75.00

FIELD TRIP GUIDEBOOKS

9. Upper Cretaceous Outcrops, Northeast Mississippi and West Central Alabama, Fourteenth Field Trip, 29 pp., May 1959 ..... 4.00
10. Cenozoic of Southeast Mississippi and Southwest Alabama Fifteenth Field Trip, 52 pp., May 1960 ..... 6.00
11. Cenozoic of Horn Island and the Pascagoula Valley 10th Annual GCAGS Meeting, 24 pp., October, 1960 ..... 2.50
12. The Paleozoics of Northwest Arkansas Sixteenth Field Trip, 28 pp., May, 1962 ..... 5.00
13. Tertiary Type Localities of East-Central Mississippi, 25th GCAGS Meeting, 133 pp., October 1975 ..... 5.00
14. Mississippi Rocks of the Black Warrior Basin, Seventeenth Field Trip, 79 pp., April, 19778 ..... 8.00
15. The Cretaceous Chalk of the Starkville area, eighteenth Field Trip, 69 pages, April 19-20, 1991 ..... 7.00

COMPOSITE LOGS AND CROSS-SECTIONS

16. Composite Mesozoic Log of South Mississippi and South Alabama 2.00
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VOLUME XLII NUMBER 8 APRIL 1994

PRESIDENT'S LETTER

It was a struggle, but we got the membership up to where we have been the last few years. For the mot part, our members have been with us for a while. However, we do add a few new members each year. It is encouraging to me to see out-of-town geologists who work in Mississippi join our Society. It lets me know that we are not alone in believing there is still good potential in our state.

A prominent Houston geologist once told me that he felt Mississippi was the most underdeveloped state in the Gulf Coast. The recent discoveries by Amerada Hess, King Ranch and Jack Phillips and Marlin help to prove his point. It is sometimes discouraging for someone to turn down a look at a prospect over the phone because he does not work Mississippi. The problems is not always that he does not work Mississippi, but that he does not know Mississippi and its potential. We need to not only promote our state, but at the same time educate geologists who are not familiar with Mississippi.

A meeting was held recently in Jackson concerning the Petroleum Technology Transfer Council. this is a new organization formed by the IPAA to promote, as the title indicates, the transfer of technology for domestic producers and operators in all regions of the country.

We are fortunate through the hard work of a few people, including some of our members, to get an Eastern Gulf Region which includes only Mississippi, Alabama and Florida. I believe the joint meetings of this organization will help to educate people on the potential of our region. If you do not know much about the new organization, ask your local IPAA member.

This month's speaker, Danny Harrelson will talk about something called the computer and its ability to make the geologist more efficient. All joking aside, this talk should be very informative. If you have ever wondered what things the computer can do for us as geologists, come and hear Danny shed some light on the subject.

See you April 12!

Geographic Information System (GIS) Applications in Petroleum Exploration

Maureen K. Cocoran, Gary Hennington* and Danny W. Harrelson
Waterways Experiment Station and Information Management Systems, Inc.*, Vicksburg, MS 39180

Wildsville field, discoverd in 1953, is located in Section 12, T7N-R6E, and in sections 7 and 37, T7N-R7E of Concordia Parish, Louisiana. the field is productive from the Wilcox trend, a prolific play in Mississippi and Louisiana. Geological data from this 9 well field was utilized to contruct a "test-bed" for subsurface modeling using GIS applications. The top of the Wilds sand (Wilcox formation) was used as the basis for a digital elevation model to depict oil migration. The well locations, along with political and ownership boundaries, are stored in relational databases which can be updated for temporal change dilineation. These delineations can be shown in choropleth maps capable of predicting all accumulations. The points of concentration can be used to spot future wellls and determine if potential locations have sufficient merit to justify additional exploraiton. This technology is also applicable to field exploration in the Mississippi portion of the Wilcox trend.

Mr. Gary Hennington is a graduate of Louisiana Tech University where he received his bachelor of Science in Electrical Engineering Technology. He is the founder and co-owner of Information Management Systems, Inc., a company dedicated to the development of Geographic Information Systems (GIS). Currently, Mr. Hennington is developing the GIS for the Picatinny Arsenal, New Jersey, Geomorphic Study being conducted at Waterways Experiment Station.

Maureen K. Corcoran received her B.S. degree in geology in 1980 from the University of Southern Mississippi. After graduation she worked in the petroleum industry for eleven years before returning to USM to earn a M.S. in geology in 1992. She is presently employed by the Waterways Experiment Station as a research geologist. She is a registered geologist and is active in several organizations including Sigma Xi Club at WES.

Danny W. Harrelson received his B.S. and M.S. in geology from the University of Southern Mississippi. He has over 17 years total experience with state and federal government, private industries and consulting companies. Currently, he is employed as a research geologist with the U.S. Army Engineers, Waterways Experiment Station, Vicksburg, Mississippi.

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Candidate biographies will be in the May Bulletin

The Election will be held at the May Lunch/Business meeting.

Meeting of the MGS Engineering / Environmental Coordinating Committee

This will be a "brown bag" luncheon meeting. Because this will be the first meeting, organization of the committee and future plans will be discussed.
Your input is needed!

WHEN: April 20 - 11:45 a.m.

WHERE: Miss. Department of Environmental Quality Hearing Room
2380 Highway 80 West, Southport Center
Jackson, MS

SPEAKER: Steve Oivanki, Mississippi Office of Geology

TOPIC: Past and Future Erosion Trends at Belle Fontaine, Jackson County, Mississippi

BUSINESS MEETING LUNCHEON

11:30 A.M. APRIL 12, 1994
Capitol City Petroleum Club,
Smackover Room
Danny W. Harrelson - Speaker
Waterways Experiment Station, Vicksburg

BUSINESS MEETING LUNCHEON SCHEDULE

May 10, 1994

SPRING FLING
May 19, 1994
Tentative

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WILLIAM MOORE RETIRES FROM OFFICE OF GEOLOGY

William H. Moore, State Geologist from 1965 to 1980, retired from the Office of Geology January 15, after working for the agency almost twenty-five years. Mr. Moore left the department in 1980 to work as a consulting geologist in the private sector. but returned in October 1989 to work in the surface mining section. He first began working for the department in 1960 as a stratigrapher and as manager of the sample library.

Mr. Moore's tenure as State Geologist saw the Geological Survey grow from a small department to a multidivisional agency with divisions in surface geology, subsurface geology, environmental geology, and surface mining. The survey became a part of the newly formed Department of Natural Resources in 1979. He was author of three bulletins, one of which is the popular Hinds County Geology Bulletin, and wrote sections of four others. Numerous other publications were completed under his leadership, including geology bulletins for six counties, several research bulletins, and reports of investigations, three environmental atlases, and the 1969 revision of the state geologic map. The legislature and other agencies called upon the survey for help for a state-run agricultural lime quarry, and possible contamination at the Tatum Salt Dome.

The Batesville native is a graduate of Millsaps College and Emory University. He is an honorary member of the Mississippi Geological Society, the Association of American State Geologists, and the Mississippi Gem and Mineral Society.

Moore's retirement plans in- clude writing fiction, something he has already been doing in his spare time. Congratulations to Bill, and we are all looking forward to the publishing of his first novel.

reprinted from the Environmental News

MEOW and the Mullets by R.E. Kelsay, Reviewed by David M. Orchard

Just a short while ago (although fast fading in practical significance for our current careers), the petroleum industry was flooded with investors. Money chased a piece of the action, the romance of exploration, the promise of ever-rising prices, and tax breaks. According to R. E. Kelsay, some 20% of total investment in U.S. exploration during the boom years was provided by investment vehicles for outside investors. In the vernacular, the money came from "mullets"..

Following the urgent tone of statements from the government, universities and think tanks, and, of course, promoters, money poured in. As Kelsay says, "America was stampeded into a six-year vacation from common sense. The small investor was herded into the corrals of the promoters."

Drilling funds, income funds, master limited partnerships, the federal lease lottery, oil-for-stock swaps, royalty funds, leasing funds, and mineral ownership pools-where did all that money go? Kelsay is able to tell us about some of it. Based in Jack County, Texas, he was involved in the formation of six drilling-fund partnerships and one start-up penny stock company. All, in the end, turned out badly for the investors. This book contains his memoirs of those years. The frontispiece states: "An oil man's observations on the late – and by some lamented – Energy Crises, and the fleeting bonanza it created for some of us."

Broadly organized in four parts, the book starts with a somewhat rambling recollection of the tenor of the times; the Energy Crisis, Jimmy Carter's Moral Equivalent of War (hence MEOW), the OPEC stranglehold, IRS tax breaks to encourage exploration, and the largely illusionary opportunity for cashing in on rising oil and gas prices. It moves on to describe the myriad types of investment programs and how each worked and failed. Kelsay then provides a highly personal account of the life and death of his public company, Circle Seven Oil and Gas, Inc. He ends the book with comments about the current energy situation of this country.

The Circle Seven story is told from the heart. Kelsay wrote this book in the same portable building from which Circle Seven was conceived and managed. The building is now a patched shambles on his farm, and he is surrounded by reminders of hopes and dreams and of that "fleeting bonanza". Financed with $3,850,000 in 1980, the company liquidated in 1989 with only $160,000 of dispersible assets. How badly were the investors hurt? The average stockholder invested $666, while the principals invested $120,000 each. In fact, whenever Kelsay uses the disparaging term "mullet", he says in effect, "I believed it too! We were the biggest mullets of all! We should have known better."

He provides a fair account of the ruins. Amongst drilling funds, there was an almost universal failure to reach payout. He comes down hard on Blinder Robinson (as did the feds), and discusses Petro-Lewis in detail. Otherwise, he rarely names names. He is critical of geologists or at least of the use to which geologic investigations were put by promoters. "Geology is the art of drawing expensive conclusions from insufficient premises."

Occasionally I found myself wishing the book would provide more of a business school type analysis of investor deals. What fallacies does hindsight expose in all of those early eighties spreadsheets that justified the investments? Kelsay provides few of those precise numbers; that isn't

(continued on page 5)

Thinking Like an Entrepreneur: Exploration and Product Potentials *by Paul Oman, Pearland, Texas*

Introduction

There is a lot of the entrepreneurial mind-set involved with oil and gas exploration and production. The idea of seeing things a bit differently than everyone else, applying a fresh approach, and looking for ways to do things better, cheaper and faster could be said equally about the inventor or about the Exploration and Production (E&P) professional.

But while we are creative in our search and production of oil and gas, we tend to have a herd mentality when it comes to how we perform our work. We question other peoples interpretation of the subsurface, but never stop to question our own methods.

It's time to turn our creative and questioning minds not just to the subsurface, but also upon the way we work and the very tools we use. By doing this we go from being a good oil finder to being a good oil finding business person-from being a good employee into being a good oil company.

Seismic Dependence

It could he argued that seismic techniques have progressed from being another very useful tool into an all-scenario crutch. Although seismic has great value, might not it be, at times, overrated, over-promoted and overly used? By any measure it's expensive. Because we have become so addicted to the magic of seismic perhaps we have been taking it for granted and applying our fertile minds toward other things.

What would happen if we questioned not just the subsurface interpretations of others, but our own methodology and tools as well? Might not such an exercise take us away from the rest of the herd and perhaps point us toward an overlooked competitive edge? Armed with our better mousetrap, we could then grow a business by developing the independent entrepreneur within.

To get you to start thinking like an entrepreneur, looking to create something truly new and wonderful, I am taking away your seismic crutch. It is no longer there. Find other tools to fill the seismic void.

Wouldn't we be in for a creative, imaginative time if I really could yank away the seismic factor? Nearly everyone would have different ideas as to the next best thing to utilize. In that diversity of thought would come new information, a few breakthroughs and great success for a selected group of right thinking individuals. And nearly all those right-thinking individuals would probably go start their own petroleum companies.

By playing the game of no seismic, limited seismic or site specific seismic only, we step away from the herd and look for something new and different in the list of alternatives-something that will provide us with a competitive edge over everyone else. This entrepreneurial competitive edge, if successful, is something we can take to the bank while our old-way competitors continue to struggle in an economic environment that getting tighter and tighter everyday.

Seismic Alternatives

Many of our seismic alternatives might seem like old, worn out approaches. Hasn't micro-magnetics / micro-gravity, photo geology and geochemistry been around for decades? Of course they have, and like seismic they have been improving over those decades. Unlike seismic, fewer people have tracked those improvements and effectively harnessed them.

Data Processing

Here's something else to ponder. There is data and there is processed data. Processed data becomes information. Even if the above data-information transition techniques for non-seismic data are still crude (and I don't believe they are) maybe there is room to create a competitive edge based upon how the old data is processed (just like the reprocessing of older seismic data). Using today's computers and computer-based neural net analysis, 3D visualization, etc., old data sets might easily give up new insights and clues not apparent 25 years ago. That's the belief of a company called Ultimate Resources and their trademarked Superinduction data set analysis services. The company's principles have the credentials and track record necessary to merit your attention.

Remote Sensing

As for photogeology/remote sensing, this author spent many hours with a grease pencil and satellite and/or high altitude imagery prints during the early 1980s looking for tonal anomalies and other features that could add support to a log-based subsurface interpretation. Even without the then still-to-be invented workstation, the results were encouraging enough to result in two papers published in Oil & Gas Journal. What would happen it such crude interpretations were dusted off and statistically analyzed or enhanced? Would a new competitive edge result?

Micro-gravity/Micro-magnetics

Jack Land of J.P. Land & Associates has spent many years as a micro-gravity/ micro-magnetics consultant and interpreter. He remains busy with clients from all around the world who see a need and an economic value for these exploration tools. Even non-earth scientists can imagine how much more sensitive and exacting gravity and magnetic sensors have become over the past 20 years. That alone is reason enough to look into these tools as a potential source for a new competitive edge. *(continued on page 6)*

MEOW & Mullets

continued from Page 4

his purpose. This is a personal account, proud but humbled and apologetic and very tongue in cheek. He was inside an event of historic economic proportions, and he has written a book about it. More people ought to write such books, and more people ought to read them.

Meow and the Mullets is available from:
Mr. R.E. Kelsay
Jacksboro TX 76568-0670
$15.95

reprinted from the Houston Geological Society Bulletin

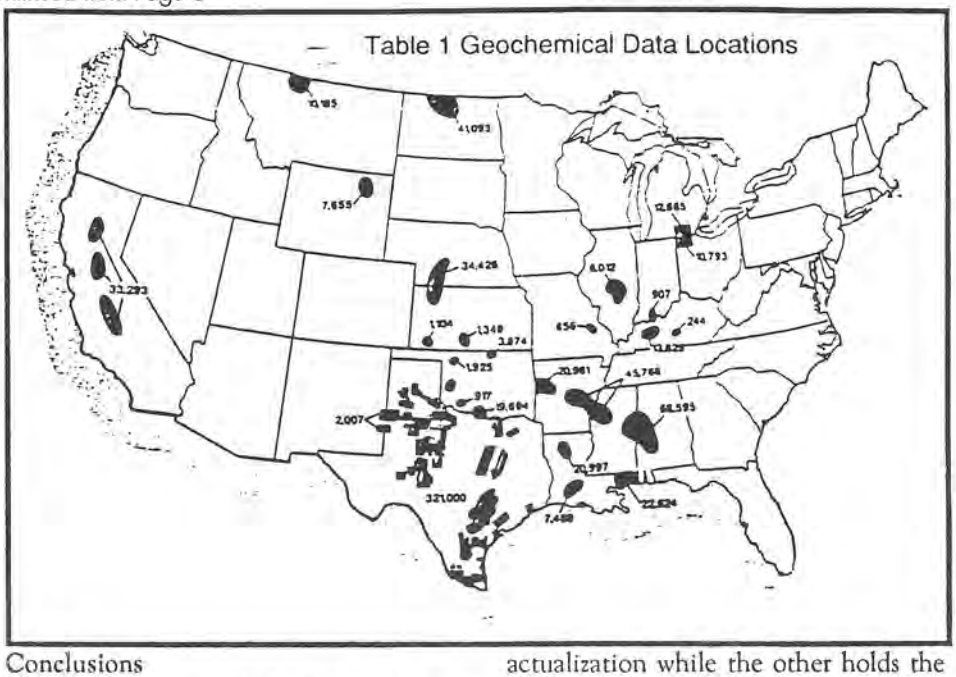
Thinking Like an Entrepreneur Continued from Page 5

Geochemistry

Finally, there is geochemistry. It's heyday was in the late 1950s and early 1960s, just before the computer technology driven rebirth of seismic. Martin Davidson, a former Crown Central geologist mentioned in an article he wrote long ago that 65% of Crown's 1960 production came from 1% of their leases. That 1% were leases bought based upon geochemical evaluations between 1940 and 1957.

Now fast-forward geochemical analysis into the microchip, gene splicing, AIDS research, CRAY supercomputer age and take a guess what the results might be.

Table I shows a coverage map of nearly 1 million geochemical sample sites that both you and I have access to for our future E&P projects. Like existing seismic lines, that data is already there. It simply needs new, fresh analysis. Of course new proprietary data can also be collected. Either way, geochemical surveys certainly hold secrets left for you or me to discover. Whether those secrets are actual new discoveries, field extensions or ways to better target and to minimize the use of surface seismic, the result is money in our pockets. That's a big chunk of what constitutes a competitive edge.



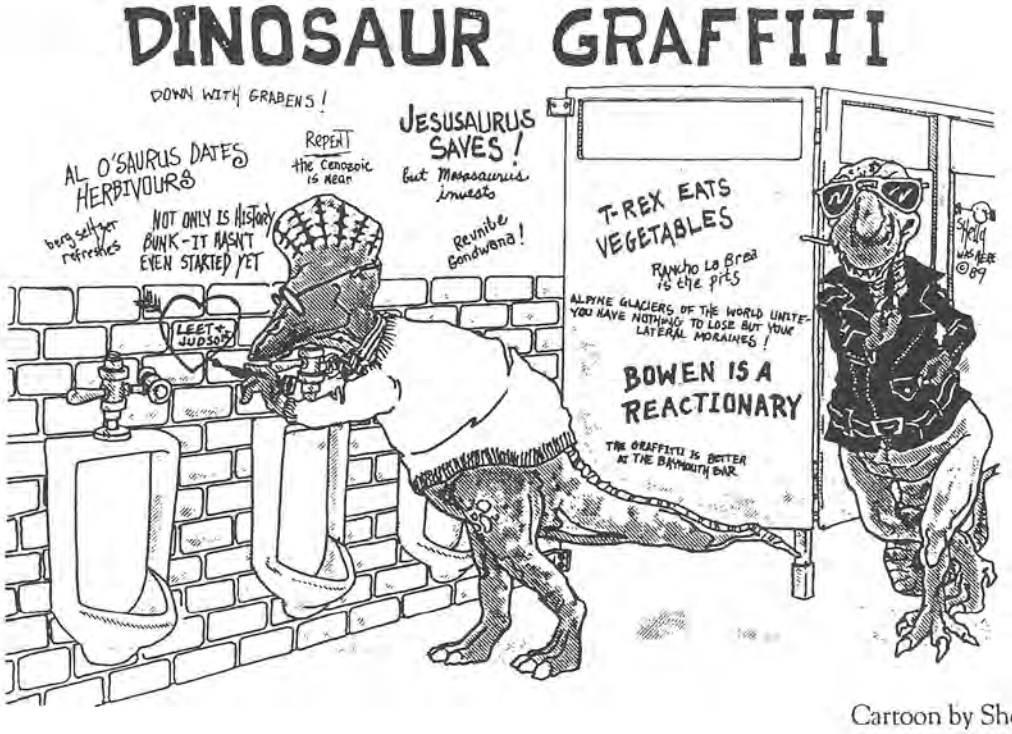
Conclusions

At times this paper has read like an integrated exploration article. That was not the purpose. The aim of this paper was to germinate the entrepreneurial seed within. The parallels between integrated exploration and gaining the E&P competitive business edge are such that the two tend to merge at times.

But while the similarities are there, so are the differences. One is a kite with $0.39 worth of string. The other has $3.99 worth of string. One offers freedom, unlimited wealth and self actualization while the other holds the threat of a pink slip in your regular weekly corporate paycheck. That's reason enough for you to start thinking like an innovative business person and developing your entrepreneurial potential.

Paul Oman is a AAPC Certified Petroleum Geologist and a member of AAPG, SPE and and SEG.

Reprinted from the Houston Geological Society Bulletin



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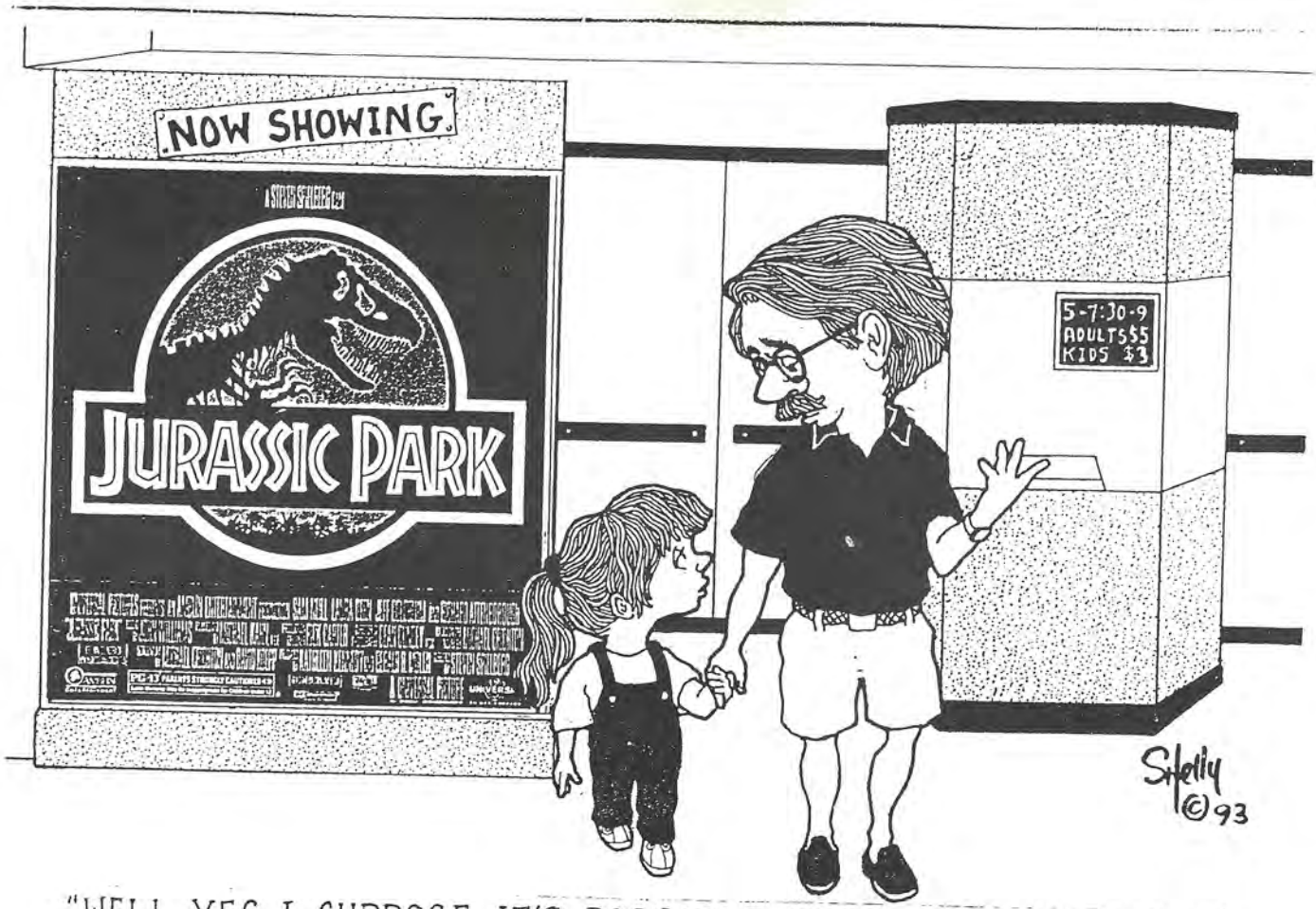

"WELL, YES, I SUPPOSE IT'S POSSIBLE THAT TYRANNOSAURUS REX BECAME EXTINCT BECAUSE HE ATE LAWYERS."

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VOLUME XLII NUMBER 9 MAY 1994

PRESIDENT'S LETTER

by Brian Sims

It doesn't seem like it has been a year since I started writing these letters. I will certainly have a better appreciation for the President's Letter in the future. Good luck, Neil.

I would like to thank everyone who has helped our society to continue to survive and provide a good environment for people to meet and share ideas. I also want to thank all the officers and committee chairmen for all their help this year. I would especially like to thank Stan, Thieling, our Bulletin editor. Without his persistence, we would not have the quality Bulletin we have.

We will vote for new officers at the May meeting. Two positions are contested this year. Please make every effort to attend the May meeting so that we can get a good vote.

Our May speaker is Phil Lakin. He will speak about one of the hottest plays in Mississippi, the Frio play in Southwest Mississippi. His talk will deal with Seismic "Bright Spots". This meeting will be a joint meeting with the Jackson Geophysical Society.

See you May 10!

Also, mark your calendar for the Spring Fling on Thursday, May 19.

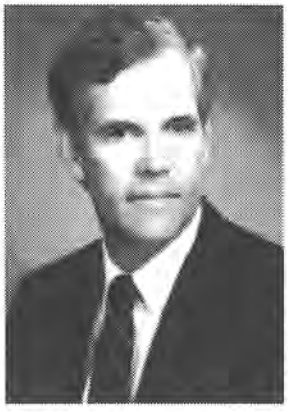
SOUTHWEST MISSISSIPPI FRIO HCI EXPLORATION TECHNOLOGY

Phillip Lakin
Geophysical Consultant - Seagull Mid-South

One of Arkla Explorations primary exploration targets during the last six years was the Cretaceous Tuscaloosa formation located in Amite and Wilkinson Counties of Southwest Mississippi. This is basically a near shore, distributary Channel complex of point bars located at an average depth of 12,000 feet. Arkla Exploration was involved in five field discoveries in a four year period of time that included Independence Field, Thanksgiving Field, Berwick Field, St. Patricks Field and Longleaf Field. Independence Field was Oligocene Frio in age while the others were upper cretaceous Tuscaloosa. Early on, explorationists recognized shallow (<5000') Frio and miocene seismic anomalies that displayed very high amplitude and historically were attributed to gas filled sands of limited commercial value. However, as seismic data base mileages were increased and line spacing distances decreased it was recognized that a "cluster" of these anomalies was developing in a concentrated area around the Centerville, Mississippi townsite. The seismic coverage was beginning to define shallow miocene anomalies of significant size in areal extent. It was becoming clear that Arkla should "Test" the exploration idea and eventually was able to statistically show success ratios of eight out of ten or more and EUR's, in some cases, that approached 3 bcf per well.

This presentation will illustrate the techniques developed by the explorationists at Arkla used to evaluate (pre-drilling) these Frio anomalies.

PHILLIP LAKIN – PERSONAL PROFILE



Most recently with Seagull Mid-South as Chief Geophysicist, Phil now operates as a Geophysical Consultant in Shreveport, Louisiana.

Phil graduated from Texas Western College (now UTEP) in 1966 and immediately began his geophysical exploration career with Mobil Oil Corporation working the Gulf of Mexico area. After three years of various opportunities with Mobil, he accepted a position with El Paso Natural Gas and worked world-wide with major emphasis in West Texas and Western Oklahoma. Before joining Arkla Exploration as Manager of Geophysics in 1986, Phil worked with a large independent in Tulsa and worked the gulf coast, the rockies and mid-continent basins. At Arkla, exploration efforts mainly included the four state area of Texas, Oklahoma, Louisiana and Arkansas. During his tenure at Arkla, Phil was instrumental in increasing their sesmic data base from 8,000 miles to in excess of 42,000 miles of modern CDP data. In addition Phil was directly involved in bringing Arkla's geophysical efforts into the HITECH level of exploration technology. Phil is currently a geophysical consultant in Shreveport and specializes in all phases of geophysical exploration technology with respect to acquisition, processing and interpretation.

MEETING OF THE MGS ENGINEERING/ENVIRONMENTAL COMMITTEE

This will be a "Brown Bag" luncheon meeting.
Please mark your calendar
and plan to attend.

June 22 (Wednesday) – 11:30 a.m.
Miss. Department of Environmental Quality Hearing Room
2380 Highway 80 West, Southport Center
Jackson, MS

Speaker:
Dr. Dwain K. Butler
U.S. Army Waterways Experiment Station

TOPIC
Environmental Physics
The Best Kept Secret of Environmental Resoration

BUSINESS MEETING LUNCHEON

11:30 A.M. MAY 10, 1994
Capitol City Petroleum Club,
Smackover Room
Phillip L. Lakin
Geophysical Consultant - Seagull Mid-South

BUSINESS MEETING LUNCHEON SCHEDULE

May 10, 1994

SPRING FLING
May 19, 1994
Tentative

Mississippi Geological Society – 1993-1994

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The 44th annual convention of the Gulf Coast Association of Geological Societies will be held in Austin, Texas, October 5-7, 1994. The theme of this year's convention is "Energy and Environment". A strong technical program emphasizing both the energy and environmental challenges facing the Nation as we move toward the 21st century is planned. Preliminary indications suggest that approximately 1,000 energy and environmental professionals will register for the convention and each registrant will receive a copy of the 1994 TRANSACTIONS. This publication, which contains the technical papers presented at the convention, is widely used as a reference by schools and industry.

We are currently seeking advertisers for the 1994 TRANSACTIONS. financing for the TRANSACTIONS is accomplished to a great degree through funds collected from advertiser. If you have been a supporter of previous conventions, we would appreciate your continued support. If you have not previously advertised in the TRANSACTIONS, please consider doing so now. For as little as $85.00 you and/or your company's expertise, experience and know-how can be brought to the attention of leaders in both the energy and environmental industries.

If you would like to place an ad in the 1994 GCAGS TRANSACTIONS. please complete the order form below and return by May 15 with your unmarked ad-copy as you wish it to be printed. The absolute deadline for getting your ad-copy to us is May 31, 1994. Payment with your order is greatly appreciated and will be promptly acknowledged. Proof sheets showing your advertisement can be provided following submission to the printer. We can also provide limited assistance with drafting of ads if necessary.

Please send your ad-copy, order form, and any correspondence by May 31, 1994 to:

Peter A. Boone, Advertising Chairman, GCAGS '94 Convention, Mail Slot 561, P.O. box 9802, Austin, TX 78766-0802

Thank you for supporting the 1994 TRANSACTIONS and the 44th Annual Convention of the GCAGS.

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It is agreed that the undersigned will purchase advertising space in the 1994 TRANSACTIONS of the GCAGS to be published in connection with its annual meeting in Austin, Texas, October 5, 6, and 7, 1994, as follows:

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Development of the ASBOG National Geologist's Exam

by Phyllis M. Garman, CPG-3228

During 1992 and 1993 the Association of State Boards of Geology (ASBOG) conducted test development and validation workshops to develop a national examination for geologists. This effort was initiated by the Arizona Board of Technical Regulation and followed with an agreement for co-operative participation between ASBOG and Arizona.

The workshops have been led by Jack L. Warner, Ph.D.. psychometrician and examination consultant. and Steve P. Warner. Ph.D., psychologist. Participants are professional geologists representing the ASBOG member states (Arizona, Arkansas, Georgia. Oregon, South Carolina. North Carolina. Virginia, and Wyoming) and representatives from professional geological societies —NGWA/AGWSE, AIPG, AEG, AGI, AASG, AIH, and AAPG. Other states whose boards are interested in becoming members of ASBOG but have not joined at this time have also been represented. These are California, Texas, Florida, Tennessee, Delaware, Indiana, Idaho, and New York.

Participants in the development of the national exam are experienced geologists from across the United States. They are termed "Subject Matter Experts" and all have contributed to this effort by donating many hours. The first step in the process was to establish a guideline of "What do geologists do?" This is the Job Task Analysis, which consists of specific job tasks performed by professional geologists. This listing is the blueprint that has guided the exam content .

The examination consists of two parts —Fundamentals of Geology (FG) and Principles and Practice of Geology (PPG). Until enough examinations have been given and an appropriate statistical data base has been established. the exam results will continue to be evaluated by the Subject Matter Experts under the psychometrician's guidance.

The examination is valid. It meets. and is scored under, accepted psychometric standards. Reciprocity (and temporary permission to practice within another state) will be made easier for geologists in the states whose registration boards accept the ASBOG exam. Arizona, Wyoming, and South Carolina have already used the examination to test their candidates for registration.

During 1994 ASBOG plans to update the exam blueprint by conducting a professional geologist task analysis survey on a more extensive base. Survey forms will be sent to selected geologists in all states to solicit information on the types of tasks they routinely perform and the portion of their time spent on each. ASBOG will take over the responsibility of the exam this year. It will be administered in the participating states in April and October.

Reprinted from *The Professional Geologist*, March, 1994

Cartoon by Shelly with permission.

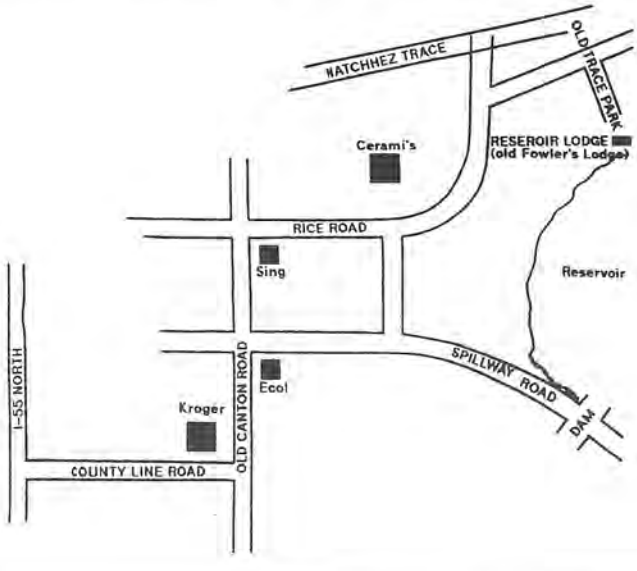
Spring Fling

Thursday, May 19 – Reservoir Lodge

Festivities – 4:30 p.m.
Dinner – 6:00 p.m.

$10.00 per person
$5.00 per student

Members & Spouse/Guest only
No children please



DAVID BAKER BRASFIELD, Retired Geologist

David Baker Brasfield, 67, of Armour Drive, a retired geologist, died of emphysema Friday, April 15, at St. Dominic-Jackson Memorial Hospital.

Graveside services were held at 2 p.m. Monday, April 18 at Tuscaloosa memorial Park.

Mr. Brasfield, a Tuscaloosa native, had lived in Jackson 16 years. He formerly lived in New Orleans. He was a graduate of Tuscaloosa High School and received his bachelor's degree in geology from the University of Alabama in 1949 and did graduate work in geology at Louisiana State University, Baton Rouge, in 1950-51.

After serving in the Army, Mr. Brasfield began his career as a petroleum geologist, spending more than 40 years studying the subsurface and stratigraphy of the Gulf Coast region. In the early 1950s he worked in Talara, Peru, for International Petroleum Oil Co. Two years later, he joined the old Carter Oil Co. in Shreveport and later worked for it in Jackson. In 1964, when Carter became part of the Humble Oil and Refining Co., he joined Humble in New Orleans and became its lead stratigrapher in the "Smackover trend," of north Louisiana, Mississippi Alabama and Florida. He was a key figure in Humble's discovery of the Jay and Blackjack Creek Smackover Fields in Florida.

In 1974, Mr. Brasfield became an independent geologist with Tesoro Petroleum Co., in New Orleans and helped discover the Fanny Church Field in northeastern Florida. In 1977, he became division manager of William Moss Enterprises and the Petroleum corp. of Delaware in Jackson. Under his leadership, the company was credited with several significant oil finds, including ones at Hooker Field, Bakers Creek Field and Pleasant Ridge Field in Mississippi.

In 1983, Mr. Brasfield joined Harkins and Co. in Jackson as exploration manager for the Southeast. With Harkins, he discovered the Ellisville Junction Field in Jones County. In 1989, he became an independent consulting geologist associated with Paramount Petroleum Co. Inc. of Jackson.

Mr. Brasfield was an antique gun collector, a gunsmith, historian and hunter.

Survivors include: wife, Clara; daughter, Dana Taff of Jackson; sons, David W. Brasfield of Murray, Ky., Neil Baker Brasfield of Jackson and John Fleming Brasfield, of Tuscaloosa.

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Professional Memberships: MGS, AAPG, IPAA

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Experience: High School Teacher 1972-1973
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U. South Alabama, BS Geology

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Core Lab 1973-1977
Location Sample Service 1977-1993
Office of Land & Water 1993-present

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Professional Memberships: MGS, Soc. Core Analyst

Andy Sylte

Education: Florida State University BS Geology 1982

Experience: Hughes & Hughes 1982-89
Prairie Producing Co. 1989-90
Independent Geologist: 1990-Present

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MGS Experience: MGS Projection Comm., Committee chair, 1992-GCAGS Conv.

TREASURER

Mark Stephenson

Education: UNC, BA, Geology

Experience: Champlin Petroleum 1981-1984
Coastal Oil & Gas 1984-1989
Austin Production 1989-1990
Paramount Petroleum 1990-Present

MGS Experience: Chairman Tobin Theater Committee 1992 GCAGS Convention

Professional Memberships: AAPG, MGS

A John Warner

Education: USM, BS Geology

Experience: Anadrill, Downhole Data, Inc. and The Mudlogging Company 1983-1990
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