

On the Rocks



A Newsletter of the Michigan Basin Geological Society
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EVENTS

February 13, 2002: MBGS Meeting-The speaker is Dr. Kandia Balachandran and his topic will be "Shear Wave Techniques as Exploration and Development Tools".

February 19, 2002: PTTC Workshop Holiday Inn South, Lansing, Michigan; "New Field Technologies by Small Independents To Maximize Production and Profits from Mature Fields".

February 25-27, 2002: 2002 SME Annual Meeting in Phoenix, Arizona. Contact Tom Godbold for information (See MBGS Officers List)

March 13, 2002: Joint MBGS-SPE meeting with Charles Thomas presenting; "Methane Hydrates: A Major Energy Source for the Future or Wishfull Thinking?"

March 10-13, 2002: AAPG annual meeting, Houston, Texas. Professor Emeritus at U of M and honorary MBGS member James E. Wilson will receive the 2002 Sidney Powers Memorial Award.

October 6-8, 2002: AAPG annual Eastern Section meeting, Champaign, Illinois.

Shear waves in Exploration

Shear-wave (S-wave) propagation in a given medium is determined by the rigidity of the medium alone, whereas compressional-wave (P-wave) propagation is determined by the rigidity and compressibility of the medium. This difference affects the amplitudes of reflected P-waves (the type used commonly). Changes in amplitude caused by the variations in fluid content in a reservoir for example can be confirmed if there is no corresponding change in S-wave reflection amplitude. This is just one illustration of the advantages of using both P- and S- waves in exploration.

In “Shear-wave Exploration” (Danbom, S.H. and Domenico, S.N.) published by the Society of Exploration Geophysicists the authors express their view for the future by the statement “The promise of mode-converted S-waves, a subset of the bigger multi-component issue, needs to be thoroughly tested”

Field observations made in the Powder River Basin clinkers, in field sites around Tulsa, and in eastern Saudi Arabia suggest that converted shear waves may in fact point a way to direct detection of fluids in reservoirs. The field observations are primarily wave tests and the principles that we extract are:

Common receiver gathers of data may be a good starting point for preprocessing the data. The anomalously high amplitudes of “converted shear-waves” in comparison with corresponding P-wave reflection amplitude may in fact be indicative of “fluid” in the reservoir. In this instance the Arbuckle or the Viola formations are the likely reservoirs.

Biography

Kandiah [BALA] Balachandran

Presently Assistant Dean at Arcadia Campus of Kalamazoo Valley Community College. He has taught Math and Physics at KVCC for the last 8 years.

Bala is a native of Sri Lanka where he obtained a B.S. in Physics. He attended Graduate School in Geophysical Engineering at Colorado School of Mines where he earned a Doctorate. He has accumulated 15 years of Seismic R & D and Exploration working with Amoco, CIG Exploration, Unocal, and Aramco. Among his achievements are the study of seismic noise in the clinkers of Powder River Basin of Wyoming and the follow-up experiments around Tulsa.

He has published two papers in Geophysics and has presented technical papers at various professional society meetings such as the SEG, AAPG, SPE, AGU, and SSA.

MBGS Meeting

February 13, 2003

Location: Mountain Jacks
5800 W. Saginaw Highway, Lansing, Michigan

Schedule: 4:30-5:30 PM Executive Committee Meeting
5:30-6:15 PM Cash Bar
6:15-7:15 PM Dinner
Presentation after Dinner

Cost \$25.00/member \$10.00 Student (includes dinner)

Topic: “Shear Wave Techniques as Exploration and
Development Tools.”
By Dr. Kandiah Balachandran

MBGS Dinner Meeting Reservation

Name _____

Number attending _____

Enclosed Registration Fee _____

Please make your check out to the MBGS.

Send to: Bruce Arndt
508 W. Michigan Ave.
P. O. Box 763
Jackson, Michigan 49204
Ph: 517-782-8206 Fax: 517-782-8205

Trip Director

The MBGS is still looking for a person to take over as Field Trip Director. Tim Cowen held this position for many years and has done a great job. This is an opportunity to set up trips to areas that you may have wanted to visit. The Society is also open to nominations for this position. The MBGS can only continue to exist if its members are willing to contribute some of their time to keep it going so I urge you to seriously consider the job.

MEETING CANCELLATION POLICY

Monthly meetings will be automatically cancelled whenever the National Weather Service issues a "Storm Warning" for the Lansing area. If driving conditions are poor but a "Warning" has not been issued please contact any member of the Executive Committee for the status of the meeting.

Levorsen Award Winner – Eastern Section

The Levorsen Award at the recent Eastern Section meeting held in Kalamazoo, Michigan went to the paper, "Midcontinent Interactive Digital Carbon Atlas and Relational Database (MIDCARB)." The co-authors are:

James A. Drahovzal, Kentucky Geological Survey, Lexington, Kentucky,
Lawrence H. Wickstrom, Ohio Department of Natural Resources, Division of Geological Survey, Columbus, Ohio,
Timothy R. Carr, Kansas Geological Survey, Lawrence, Kansas,
John A. Rupp, Indiana Geological Survey, Bloomington, Indiana,
Beverly Seyler, Illinois State Geological Survey, and
Scott W. White

MSU Guest Lecturer

The Department of Geological Sciences has a Guest Lecturer scheduled for Thursday, January 31, 2002. The speaker is Dr. Simon Brassel, Indiana University. The title is "Molecular Records of Ancient Plankton: Clues to Oceanic Paleoenvironments, Climates and Evolutionary Change". The talk is scheduled for 4:00 p.m. in room 204 Natural Sciences. Coffee will be served at 3:30 p.m. in room 207 Natural Sciences.

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PTTC Workshop

New Field Technologies by Small Independents To Maximize Production and Profits from Mature Fields

February 19, 2002 Lansing, Michigan

Using two DOE-funded field research projects, independent operators themselves demonstrate technologies which:

Increase production
Reduce operating costs, and
Reduce environmental concerns

Technical solutions for today's problems are presented by the actual small independent operators who applied them in mature fields.

If you are an independent, geologist, engineer, consultant, owner—or anyone responsible for maximizing production and profits from mature domestic properties, this presentation was made for you.

This DOE-sponsored workshop has been very well received. The best part is the interplay with the operators who spoke. Attendees emphasized that the technology learned from other basins had real applicability in their own back yards.

These Six independent operators will share their results:

On-lease power generation in Kansas—Well operations at the Williams Unit were becoming uneconomic because of high electrical utility costs. Due to high lease production costs, 3 wells were shut in and the 11 remaining wells were close to the break-even point. The wells typically produce at high water-cut and marginal oil production, averaging 8.5 BOPD and 350 BWPD. American Warrior, Inc., plans to significantly reduce lease production costs by using the available onsite natural gas to power an electrical generator. The generator will provide electricity to run 12 beam pumping units and two electrical submersible pumps. American estimates a 65% reduction in electricity costs that result in saving \$9,675 per month in operating costs. Reduction in operating costs will allow resumed production on three shut-in wells and an increase in production in several of the other 11 wells.

Developing a marginal-expense oil well wireless surveillance system—Frequent manual inspection and monitoring of shallow wells is impractical and uneconomic. Profits are lost when you can't correct well problems promptly and maximize production efficiency. Currently there are no inexpensive, cost-effective remote production monitoring techniques for marginal oil well surveillance. Vaquero Energy is developing such a system which will result in large labor savings and significantly improve production efficiency. This could extend the economic producing life of many marginal wells.

Selection and Treatment of Stripper Gas Wells for Production Enhancement in the Mid-continent—Research into production enhancement from gas reservoirs was first funded by the Gas Technology Institute, which investigated methods to identify restimulation candidate wells in tight gas plays. The DOE is now extending this work for application to stripper gas wells. The candidate selection process being developed by

Advanced Resources International, Inc., involves applying pattern recognition and engineering-based analytic methods to a field dataset, then integrating them via a screening process to identify production enhancement opportunities.

Remediating Produced water from stripper gas wells--Stripper gas well operators need to maximize production from low-productivity wells. Because hundreds of wells covering thousands of acres take so much labor and money to manage, operators are hard pressed to correctly identify and remediate marginal wells. This impacts overall field production and project economics. Schlumberger Holditch-Reservoir Technologies recognized that operators need an easier and faster way to screen the stripper gas wells and identify those that need remediation. The solution is *SWARM—Stripper Well Remediation Methodology*—a new pc-based software product.

Benefits from Reservoir Simulation for Small, Geologically Complex Reservoirs—Reservoir characterization, modeling and simulation resulted in a significant change in the depletion strategy for the Cascade Sand zone of the Mission-Visco Lease in the Cascade Oil field of Los Angeles County, LA. Initially, increased water injection down-dip with simultaneous gas injection up-dip was planned to increase production. Patriot Resources' information from reservoir characterization/modeling, however, indicated that in-fill drilling and relying on natural water influx from the aquifer could increase remaining reserves by 125,000 barrels of oil per well, and that up to 10 infill wells could be drilled in the field. Through this scenario, field production could be increased two to three times over the current 60 bopd.

Hydrochloric/Phosphonic Acid Combination Improves Well Performance—St. James Oil Corporation used a combination hydrochloric/phosphonic acid stimulation treatment in four wells in the Los Angeles Downtown Oil field to improve well performance and inhibit calcium carbonate scaling. In the four treated wells, the combined production response has averaged about 122 bopd, a 220% increase over oil production prior to acid treatment, and slightly higher than would be expected with conventional hydrochloric acid treatments. Post-treatment decline rates have also been measurably flatter than would be expected following conventional treatments.

In addition to operator presentations, speakers from the DOE will talk about their on-going efforts to fund still more field-oriented projects and show how you can participate in future projects.

These are the projects that funded our speakers' research and field application:

DOE's Technology Development with Independents, funding techniques in

Reservoir characterization

Drilling

Completion and stimulation

Artificial lift

Secondary or tertiary oil recovery

Environmental compliance, and

Production management

DOE's Stripper Gas Well Program, developing new approaches for

Identifying under-performing wells, then

Taking corrective action

If you have a field problem and want to apply newer technology to increase production, and/or save operating costs, come and learn how you can be funded to do it. **This year these two programs had more money to give than qualified projects submitted.** So, this really could be your tax dollars at work on your problem.

Date and location: February 19, 2002, from 8am to 2:30pm at the Holiday Inn South and Conference Center, Lansing, Michigan. For room reservations and travel directions, see: www.holiday-inn.com/lansing-south

Workshop fee: If received by us by February 10, 2002--\$35, which includes a workbook, refreshments, and a hot lunch. Workshop fee at the door: \$50. (When we first planned this, we were going to charge \$75, reflecting our costs. However, the DOE and PTTC have significantly underwritten this program, so we are able to bring it to you at this much reduced cost. Thank you, DOE and PTTC!)

Cancellations: If you cancel a paid reservation by February 10, we'll refund all your money. After that, we'll give a refund only if we are able to fill your spot. Sorry.

Workshop Registration Form

NAME _____

COMPANY _____

ADDRESS _____

PHONE _____ e-mail _____
(please print)

How are you paying? (please check one payment type) Workshop fee \$35

_____ By Credit Card: (please circle one card type) Visa MasterCard
Card No. _____ Exp. Date _____

_____ By check—made payable to “WMU Geosciences Department” at:
PTTC Workshop
Geosciences Department
Western Michigan University
Kalamazoo, MI 49008-5241

This workshop is sponsored by the Michigan Center for the Midwest Regional PTTC at Western Michigan University. For more information, call Kathy Wright at (616) 387-5486 or e-mail our director, Dr. William Harrison, at harrison@wmich.edu.