



Appalachian Region

Timely, Informed Technology Decisions

Newsletter

Winter 2006-2007

Vol. 7 No. 3

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FROM THE DIRECTOR’S DESK

The end of the year is rapidly approaching, but I still have just enough time to slip this 3rd edition of newsletter volume 7 on-line before the final deadline, keeping my record of three per year for seven years intact.

This certainly has been a tumultuous year for PTTC. Last Spring, forewarned that we might be facing the loss of federal funding, we mounted a serious campaign to alert producers to the threat and requested action on their part to intervene on our behalf with their Congressional delegations. By doing so, we had hoped to save PTTC as we then knew it. Unfortunately, this campaign was unsuccessful, and first the White House, and then Congress, eliminated funding for most DOE oil and

gas research, including technology transfer funding for PTTC.

However, the PTTC Board of Directors, on which Rick Goings (Dominion) and I both serve, refused to simply congratulate each other on a job well done during the past 12 years and then drift apart. Instead, the Board has aggressively pursued reinventing PTTC as an industry-driven, industry-funded enterprise that will continue to serve the technology transfer, and perhaps the research needs, of domestic producers. The results of this restructuring and marketing effort are described below. Please take the time to read the two articles related to the new PTTC.

It is important to note that PTTC has not totally given up on a federal funding option, and again, this is an area in which you can help. During the recent AAPG Eastern Section meeting in Buffalo we had an exhibit announcing the pending birth of the new PTTC, and I was amazed at the number of individuals who came up to us and said that they did not realize that DOE funding actually had been lost, and that they wished now that they had responded last Spring when the battle was being fought - and lost. But, it is not too late to get involved in the new funding cycle for FY08. PTTC is quietly and efficiently making its case in the halls of Congress and is optimistic that federal funding, at a reduced but still important level, can be secured for the part of 2007 and possibly beyond. If you believe that PTTC has been of value to you, please consider advising your Congressional delegation to this fact, and alerting them to our effort to reinstate funding.

At the same time, industry funding will be absolutely necessary to move PTTC forward beyond April 1, 2007, the end of the no-cost extension of the current DOE contract. The size of our program will be determined by the amount of industry funding that is provided. So, please consider supporting PTTC at the level commensurate with your company size and volume of production (see below). With your help we can continue with our program to inform you of advances in technology that should be important to producers in this basin.

Introducing: the “New” PTTC

PTTC’s Board of Directors and Management & Budget Committee have completed their “Business Plan 2007” in which the new organizational structure and membership plan are described, as well as several new initiatives that will be offered in addition to the traditional core resources (workshops, websites, newsletters, publications).

As the end of the old PTTC draws near, we are still determined to plan and host two more workshops, probably in March, on public oil and gas databases and what they can offer to producers, and a workshop on shale plays, specifically comparing the Devonian (Huron) shale and Antrim Shale plays to the Barnett Shale play.

We also are considering forming a new research consortium, now that the Trenton-Black River Research Consortium has completed its work and submitted the play book to DOE for distribution to producers on CD rom or DVD. The new industry-government-academic consortium would focus on the Appalachian basin Devonian shale plays. If you receive an invitation to attend a Stakeholders meeting, please seriously consider attending. If you would like to be sure that you receive an invitation, please contact me.

And finally, because I refuse to accept the possibility that PTTC truly is approaching the end, I will not say thanks and goodbye. Instead, I will encourage each of you to consider supporting the new PTTC, and wish each and everyone of you a happy and safe holiday season and a prosperous new year.

Doug Patchen
RLO Director

The proposed organizational structure differs in several important ways from the current structure. The new organization will have four main elements: volunteer leadership on the National Board of Directors; volunteer expertise on the Regional Producer Advisory Groups; an efficient and experienced National Headquarters staff; and experienced Regional Lead Organizations that will execute technology transfer in their areas. However, the composition of the Board of Directors

will be changed, and two new and very important committees have been created.

The new BOD will include 14 to 16 voting members and 5 non-voting members. Voting members include the Chairman, elected by the BOD who then is freed from any regional obligations as a PAG chair; a Vice Chairman elected by the BOD who will continue to serve as a regional PAG chair; the 9 other regional PAG chairs; one RLO representative; a representative of the new Technical Advisory Committee; and from one to three representatives of the new Industry Advisory Committee. Non-voting BOD members include the Immediate Past BOD Chair; the Ex Officio Executive Director and Treasurer; and representatives of the Independent Petroleum Association of America and the Interstate Oil and Gas Compact Commission.

Membership of the Industry Advisory Committee will be comprised of major financial donors or others appointed by the Board. This committee will play an important role in shaping new PTTC initiatives and developing standards for the regions. The committee will elect one representative for every five committee members, up to a maximum of three, to serve on the Board.

The Technical Advisory Committee will provide technical expertise to the Board in four technical areas: exploration, reservoir & development, drilling & completion, and production & operations. The maximum size of the committee

will be 18, and only one member will be elected to serve on the national Board.

Six membership categories have been defined, as well as a Charter Membership designation. Members can choose to designate funding to a particular region or regions. In that instance, their membership fees will be allocated 75% to the region(s) of their choice, with 25% going to PTTC in general to be distributed at the Board's discretion for national and inter-regional tech transfer, support for some under-funded regions and management and administration. For a Charter Member, the cost is four times the annual dues of each membership category. This one-time investment includes the annual dues for the first year. Charter members will be recognized as long-term, committed supporters of the new PTTC.

The six membership categories are further divided into two individual and four corporate membership categories. Individuals may join as an Associate Member or a Professional Member. Discounts and some services available to Professional Members will not be available to Associate Members.

Corporate Membership levels are determined by the number of employees or by the daily net BOE produced by the company. Employee ranges are: Small Producers, 2-20 employees; Medium Producers, 21-50 employees; Large Producers, 51-500 employees; and Super Producers, more than 500 employees.

PTTC Stakeholders Meetings Being Planned

The description of the new PTTC above is very brief. For a more detailed presentation and discussion of the new PTTC, operators are encouraged to attend one of six proposed PTTC Stakeholder Meetings that are being planned as PAG-organized and PAG-hosted events in Buffalo, Columbus, Pittsburgh, Charleston, Lexington and Knoxville. Watch for announcements or e-mail alerts advising you of the meeting location in your area.

The main purpose of the meetings is to recruit individual and company support for the new PTTC. A second purpose is to provide industry representatives the opportunity to identify topics for future PTTC workshops in the basin, so this is your chance to have direct input in the program's direction.

We propose to host concurrent meetings in Columbus and Knoxville on January 15th; Buffalo

and Lexington on January 16th; and Pittsburgh and Charleston on January 17th. These meetings will be brief, probably starting at 10:30 and ending with a hosted lunch, but are very important for the future of PTTC and for technology transfer in the Appalachian basin. Because they are so important, PTTC's Executive Director, Don Duttlinger, and Project Manager, Lance Cole, will each attend three of the meetings to describe the new PTTC in much more detail.

The presentations will include discussions of new technical workforce initiatives and new research, academic and educational facilitation services; current programs, such as the intellectual content archive, technical areas with high future

potential, workshops to "season" new professionals, a workshop & training event clearinghouses, and an expanded student training & internship; and leading edge workshops for experts, expanded Pumper workshops, expanded software training, "Oilfield 101" as a job recruiting tool, technician training, and a PTTC-sponsored research consortium. Membership categories and the overall financial plan will be discussed to assure stakeholders that this is a vibrant, long-term organization and will grow and prosper in the future.

The time to get involved is now. Please plan to attend one of these Stakeholder meetings, and commit to Charter or annual membership.

Shale Session at Eastern Section AAPG

"Black Shales - What we know and what we need to know" was the theme for the opening technical session at the recent Eastern Section AAPG meeting in Buffalo. This well-attended session featured seven presentations on a wide variety of shale-related topics such as stratigraphy, shale fabrics and sedimentary processes, vitrinite reflectance, thermal maturity, production and potential, optimizing hydraulic fracturing performance, and a geochemical assessment of shale plays.

John Martin (NYS Energy Research and Development Authority) promoted the potential of Hamilton Group (Middle Devonian) black shales and the Utica Shale (Upper Ordovician) in two of the presentations. He used maps of gross formation thickness to outline potential Hamilton play areas that were further refined by overlaying measurements of total organic carbon (TOC) and thermal maturity. In eastern New York and adjacent Pennsylvania, these shale are in the dry gas window. However, to the west, the same shales are in the oil window. Martin mentioned a current NYSERDA-funded project on the geochemistry of the Marcellus Shale that will include producing various isopachs and maps of total organic carbon (TOC), thermal maturity and kerogen quality.

The organic-rich, thermally-mature black to gray-black shales in the Utica Shale are considered to be a major source rock for gas trapped in Lower Devonian to Cambrian reservoirs. Martin referred to the shale as being sub-bituminous, mentioned that fresh samples can be ignited, and that when submerged, an oily sheen is formed on the surface of the water. Total organic carbon has been measured at more than 3% by weight in samples from New York, Ontario and Quebec. Martin suggested that more research is needed on the geology and reservoir properties of the Utica Shale.

Neal O'Brien (SUNY Potsdam) could not attend, so one of the session chairs, Gary Lash, presented his slides and made comments from the author's notes. The research was focused on determining fabric classes and relating them the mechanisms that formed them, and to gas migration through them. Six fabrics and their fabric-related mechanisms have been identified, including: flocculation, where the rapid collapse yields a preferred (laminated) orientation; dispersed clay under gravity, which yields a planar fabric; bioturbation, which yields a featureless, non-laminated fabric; low-density bottom currents that alter flocculated or dispersed clay deposits; suspension settling, that forms detached turbid

layers; and fecal pellets. Four distinct types of laminated shales were observed, and each is considered to be a useful indicator of sedimentary processes. Fabric evidence, when combined with other geological data and interpretations, is not only useful in determining sedimentary processes, but also in predicting properties of shale that influence gas migration through the shale.

Gary Lash discussed the problem of vitrinite reflectance suppression. Essentially, it has been observed that estimates of vitrinite reflectance (%Ro) commonly are less than true measurements of Ro, often by as much as 25%, in hydrogen-rich source rocks. The difference is obvious on plots of thermal maturity vs depth. Lash offered three explanations for the observed differences, related to differences in maceral type, hydrogen index and over pressure. Where changes in the profile of maturity vs depth correlate with a change in maceral type in the rocks, suppression correlates with a concentration of exinite macerals. In comparison of hydrogen index vs measured %Ro, a reduction of hydrogen index values yields very little differences in %R until a value of 125 mg/g is reached. Then %Ro begins to increase as HI continues to decrease. The bottom line in cases cited by the speaker is that the shale is mature, but there is no record of increased maturity in %Ro data. He concluded that Middle and Upper Devonian black shales in New York were affected by vitrinite suppression, at least 10%, probably more, and that the % suppression should be considered in exploration models.

Robert Ryder (USGS) continued the theme of shale maturity with a presentation on the distribution and origin of a thermal maturity high in New York and Pennsylvania and its control on gas composition. He reported that when conodont color alteration index (CAI) data were mapped, isograds of 4, 4.5 and 5 in Ordovician rocks define an area of high thermal maturity in north-central and northeastern Pennsylvania and adjacent south-central and southeastern New York. Furthermore, CAI values from Lower and Middle Devonian rocks mimic the maturation patterns defined by the Ordovician data, and a "bump" in the CAI isograds can be correlated with a high peak gas flow area in New York. Ryder believes that an increase in the

thickness of the overburden is the key to the increase in CAI data values. Although this overburden is now absent, Ryder mentioned that it may have been as thick as 20,000 feet. Natural gas in Ordovician and Silurian reservoirs within the high thermal maturity area is dry and isotopically heavy. Ryder believes that these gases originated in Upper Ordovician Utica Shale source beds and migrated vertically, in some cases as much as 1000 feet.

Javad Paktinat (Universal Well Services) examined the shale formations as reservoirs that need to be stimulated to be economic, and discussed the optimization of hydraulic fracturing performance in these shales. Appalachian basin Devonian-age shales present several problems to petroleum engineers, including low temperature, low pressure, slow frac fluid recovery, low recovery rate, long clean up time and high cost. The challenge, therefore, is to develop a frac fluid that will allow higher volumes to be recovered more quickly while extending the drainage radius away from the well bore, thus encountering more of the natural fracture network. The presentation described lab experiments and field data comparing different surfactants and their leakoff and adsorption properties. Reservoirs treated with a multi-phase fluid exhibited higher leakoff efficiencies, 50% less skin damage and higher flow rates than wells treated with conventional fluids.

The final talk of the session was a geochemical assessment of unconventional shale and tight gas sandstone plays by Dan Jarvie (Humble Geochemical Services). Geological information must be combined with geochemical characteristics to assess the economics of a resource play. The first step is to determine whether the gas is biogenic or thermogenic. Biogenic gas systems will have low flow rates, but will have long productive lives, although the gas will be lower in caloric value. Flow rates from unconventional thermogenic gas systems are dependent on the type of reservoirs (shale or tight sandstone), and organic richness and thermal maturity of the source rock. In these systems, flow rates are restricted by small amounts of oil in the reservoir. Jarvie cited the New Albany Shale in the Illinois basin and the

Barnett Shale in the Ft. Worth basin as examples of unconventional thermogenic gas developed from early mature or highly mature shales. Other thermogenic shale gas plays actually produce from intraformational tight sandstones that are interbedded with shale. Jarvie also mentioned that the hydrogen index is a better parameter than total

organic carbon (TOC) as an indicator of generating capacity, and that restoring TOC is very important when evaluating the Marcellus and Utica shales. Preferred areas are those in which the hydrocarbons have been more nearly “cooked out.”

Hydrothermal Dolomite, Trenton-Black River Sessions at ES-AAPG

The recent Buffalo meeting of the ES-AAPG featured three half-day sessions on carbonate reservoirs, with an emphasis on hydrothermal dolomitization models and the Trenton-Black River play.

The initial session, “New Approaches to Carbonate Reservoirs” on Monday morning, was the most varied of the three, featuring six talks on Niagaran pinnacle reefs in Michigan, Greenbrier Limestone (Mississippian) reservoirs in West Virginia and the Trenton and Black River carbonate reservoirs in New York and Ontario. The Monday poster session included nine posters on carbonates, particularly hydrothermal dolomites, and the Trenton-Black River play.

On Tuesday morning, Taury Smith and Denis Lavoie convened a session on “Hydrothermal Dolomitization Models and Case Studies, Trenton/Black River Reservoirs.” Seven talks were given, beginning with discussions of the widespread dolomitization in the Trenton and Black River carbonates in the region by Taury Smith, and the structural control on the development of hydrothermal dolomite and leached limestone reservoirs by Graham Davies. Subsequent talks prior to the morning break described hydrothermal dolomite and potential reservoirs on the Anticosti platform (Denis Lavoie) and in the Adirondack lowlands (Bruce Selleck).

Following the break, Matthew Johnson discussed seismic pitfalls when exploring for Trenton-Black River reservoirs in the Michigan basin, and Robb Gillespie followed with a detailed

examination of cores in the Albion-Scipio field in Michigan. This talk provided a segway to the final talk of the session, another discussion of Trenton-Black River cores. Paul Agle described horizontal cores in New York and implications for reservoir development and regional tectonics.

The Tuesday afternoon session, “Geology and Gas Geochemistry of the Trenton/Black River Play,” featured six talks by researchers who were involved in the recently completed, DOE and industry-funded Trenton-Black River Play Book project. The session began with a play overview, research summary and resource assessment (Doug Patchen), and then discussions of regional tectonic effects on hydrothermal dolomite reservoir development (John Hickman) and regional stratigraphic and facies relationships of the Trenton-Black River interval (Ron Riley).

Following the break, Jaime Kostelnik described the origin of peloidal textures in the Trenton and Black River reservoirs, and then Chris Laughrey and Robert Burruss discussed the geochemistry of natural gases found in these reservoirs.

The sessions were well attended, with good interaction between speakers and those in attendance during the brief question and answer periods following each talk.

Abstracts for all ES-AAPG talks presented in Buffalo can be accessed from the Appalachian region PTTC website. From the homepage select

Please Note: AAPG-SPE Eastern Meeting '08 Date Change

Please be advised that the dates for the 2008 combined meeting of the Eastern Section of AAPG and the Eastern Region of SPE at the Hilton Hotel in Pittsburgh have been changed. Originally, the dates were in late September. However, it was necessary for national SPE to change their annual meeting to those same dates, so we accommodated SPE by negotiating with the Hilton to change our dates to October 11-15, 2008.

Members of the Pittsburgh Association of Petroleum Geologists, the AAPG-affiliated host society, and the Pittsburgh Chapter of SPE, the local SPE host, will begin to form a Planning Committee in January 2007, and begin in earnest in the Spring to plan and host a joint meeting that exceeds even the highly acclaimed 2003 joint meeting at the same location.

Potential Gas Committee Readies New Estimates

The Potential Gas Committee is preparing final estimates for undiscovered gas resources in all major basins in the US, including, of course, the Appalachian basin. The new report will be released by mid 2007.

Members of PGC’s Appalachian basin working group met recently in Pittsburgh to refine the Appalachian numbers for the 30 gas plays in the

“Atlas of Major Appalachian Gas Plays.” The working group made one change to the format, replacing two of the original plays defined in the Atlas with two plays defined in the recent “Trenton-Black River Play Book.” These two plays are a hydrothermal dolomite play on the western side of the basin, and a fractured limestone play on the eastern side. The approximate boundary between the plays is the western edge of the Rome trough.

Play Book Well Received by DOE and GTI

DOE-NETL has announced plans to provide copies of the Trenton-Black River Play Book on either CD rom or DVD. The 600-page report was submitted to DOE by the WVU Research Corporation and the Appalachian Oil & Natural Gas Research Consortium to fulfill their final obligation under the DOE-Industry- funded Trenton-Black River Play Book project.

A three-page summary of the play book project was recently published by the Gas Technology Institute (GTI) and DOE in “GasTIPS.” The article, “Consortium Produces Geologic Play Book,” can be found in volume 12, number 2 on pages 7-9.

On page 3 of this same volume, the Editors provided a commentary on the report, referring to the play book as “Another Addition to the DOE/GTI Best Seller List.” They describe it as a “detailed report that incorporates and integrates regional geologic, geochemical and geophysical data to characterize two plays across the eastern basin.” They further state that “all expectations are that this play book will become a valuable guide for exploration and production (E&P) companies, leading to more rapid and cost-effective development of the natural gas” in these important plays.

The editors of GasTIPS also add the play book to a long list of similar publications dating

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back 30 years that resulted from collaborative efforts “sparked” by DOE and GTI (or its predecessor, GRI). They note that these publications all had three things in common: the information in them was compiled with financial support from DOE and/or GTI; it is likely that the information would not have been compiled and published independently, and if it had been, the publications would not have reached as wide an audience; and the information in the publications served as a catalyst for the development of natural gas resources that otherwise would have remained under-developed for a longer period of time.

Other publications cited by the editors as noteworthy examples of DOE /GTI-funded efforts include: seven reports on the Devonian shales in individual states in three eastern basins published between 1979 and 1981; three reports on the

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volume and distribution of technically recoverable natural gas in three Appalachian basin states published between 1983 and 1985; a series of reports published by GRI between 1986 and 1992 that provided geologic assessments of natural gas from coal seams in six basins; and five gas atlases, including the “Atlas of Major Appalachian Gas Plays” that also is a product of the Appalachian Oil & Natural Gas Research Consortium and West Virginia University.

The editors conclude that “the value of this relatively ‘humdrum’ collecting, organizing, analyzing, packaging and dissemination of data useful to E&P technologies should not be underestimated.”

We concur with that conclusion.