

## **PTTC Workshop Summary Report Eastern Region – Appalachian Basin**

**Title/Topic:** Marcellus Shale Resource Assessment and Logging School  
**Date:** November 17, 2010  
**Location:** Morgantown, WV  
**Co-Sponsor:** Appalachian Geological Society  
**Speaker(s):** Timothy Carr and Richard Smosna, Geology & Geography Department, WVU; Shahab Mohaghegh and Khashayar Aminian, Petroleum & Natural Gas Engineering, WVU; Daniel Soeder, National Energy Technology Laboratory, DOE **(schedule attached)**  
**Method Used To Advertise/Promote:** E-mail distribution list among 10 local geological societies and SPE chapters; placed on national PTTC and AAPG website/calendars; requested all 10 speakers to distribute to members of their organizations; press releases from WVU Research Corporation consultant  
**Fee:** \$150 for professionals; \$50 for students  
**Attendees:** Industry: 78 Others: 24 Total: 102

### **Synopsis/Overall Assessment:**

PTTC and the Appalachian Geological Society combined two, initially separate, half-day workshops into one full day of presentations on Marcellus Shale research results and advanced, shale-specific logging techniques. In the morning session, Dr. Timothy Carr, Marshall Miller Professor of Energy in the Department of Geology and Geography at WVU, taught a short course on advanced logging techniques that are applicable to the Marcellus Shale. In the afternoon session, the results of several DOE-funded research projects, and at least one in-house DOE research project, were integrated into one common theme: an assessment of the Marcellus Shale resource.

DOE's goals in funding the resource assessment studies were to improve our understanding of recoverable gas from the Marcellus Shale, constrain estimates of gas-in-place, investigate the geochemistry of Marcellus Shale flow-back water, and apply geologic models of the Marcellus to other shale gas resource plays. The research team took a basin-wide, integrated approach, incorporating stratigraphy, structural geology, seismic studies, geochemistry and database development into the final geologic and reservoir models.

Dr. Carr designed his morning short course to provide instruction on log analyses using Microsoft Excel with a focus on the Marcellus Shale. He began with a brief introduction to emphasize the significance of the resource potential of the Marcellus Shale Play, and characteristics common to all shale plays, including the Marcellus. He followed with a discussion of typical log suites, spectral gamma ray logs, and compositional lithology logs.

During the remainder of the morning sessions, participants worked two projects using data and EXCEL files prepared by Dr. Carr. The first project was to evaluate the difference between two Marcellus wells by creating and examining plots produced from real data. The exercise began with opening LAS files with notebook and importing LAS files to EXCEL, and continued with detailed discussions of neutron and density log background and applications, photoelectric logs, and compositional analysis.

The afternoon session was designed to present results of several DOE-funded research efforts and to review some earlier work on Devonian shales other than the Marcellus. Tom Mroz introduced this session with a summary of well data and analysis of data from oriented core taken during the older Eastern Gas Shale Project (1977-1982), and then moved on to a discussion of the results of current analysis to confirm reservoir parameters and note trends in characterization data and how this can be applied to gas development in the play.

His re-evaluation of these older studies combined with the new studies allowed Mr. Mroz to reach the following conclusions: reservoir parameters evaluated from core with microscopes, SEM and geochemistry confirm log analysis interpretation and validity utilizing log suites for quantitative analysis of shale formations; fluid migration follows bedding planes in shales that contain higher organic content, as viewed in petrographic and SEM samples; natural fractures are associated with lithologic changes in stratigraphy and show multiple episodes of fluid movement; natural fracture orientation and current horizontal stress trajectories will influence the geometry of induced fractures during stimulations; and characterization data confirm log analysis and interpretation through association of minerals, rock fabric and chemistry.

Daniel Soeder presented a summary of resource characterization and environmental assessment studies that have been and are being funded by DOE. His summary of earlier work allowed him to pose a series of questions that can be answered, hopefully, through additional geological research conducted in research labs at NETL and cooperating universities and companies. DOE's ultimate goal will be to better understand the links between Marcellus Shale geology and gas productivity, which should improve gas shale resource predictability.

NETL has two main environmental program goals: to document the environmental impact of the shale plays; and to investigate shale gas concerns reported in the popular media. To meet these goals, they plan to make rigorous environmental measurements on an actual drilling site; conduct a hydrofrac fluid tracer test to document underground movement; and investigate longer-term and cumulative landscape effects. Their anticipated outcomes include improved BMPs for shale gas production to reduce environmental impacts; defined environmental indicators for focused regulatory monitoring; and public data to create a more informed environmental debate.

Mr. Soeder then summarized concerns related to impact on landscapes; surface leaks and spills; groundwater contamination; flowback fluids; radioactivity; and stray gas.

Dr. Shahab Mohaghegh presented a discussion of top-down modeling in shale formations as an alternative to traditional reservoir simulation and modeling. Models developed in the Bakken Shale in North Dakota and the Huron Shale in the Big Sandy field, eastern Kentucky, were presented as case studies.

Dr. Kashy Aminian presented part 2 of the reservoir model discussion, which emphasized drilling horizontal wells and creating multiple fractures as technologies to exploit the shale resource. The objective of his research was to understand the production performance of horizontal wells in which multiple hydraulic fractures had been created. His approach was to conduct a simple modeling study to investigate the impact of hydraulic fractures on the performance of horizontal wells. He applied this to more than 200 Marcellus Shale wells (75%

vertical, 25% horizontal). He found a 7-fold increase in EUR in horizontal wells relative to vertical wells, and concluded that production is primarily controlled by hydraulic fractures, not geology. He also concluded that although early production is significantly impacted by the number of fractures long term production indicates a diminishing improvement with the number of fractures, and the spacing and location of induced fractures have a more significant impact on production than the number of fractures.

Richard Smosna and Kathy Bruner made the final presentation of the afternoon, which was a comparison of the key characteristics in the Barnett and Marcellus shales. A review of the literature led them to conclude that these two shales share a number of critical geologic features, but they also exhibit several critical differences.

### **Participant Feedback (Implies Feedback Form Is Measuring Following):**

#### Evaluation of Speaker(s):

Thirty six percent of the respondents gave the speakers a 5 out of 5; 84% at least a 4 out of 5.

#### Did the workshop content deliver what advertising/promotional material promised?

Twenty five percent graded the workshop as 5 out of 5 based on its meeting their expectations; 79% graded it at least a 4 out of 5.

#### What was the most valuable part of the workshop?

This was hard to determine from reading the comment section of the evaluation sheets. One person found the top-down modeling interesting; others made general comments that the talks and program were good. Most offered negative comments.

#### What was the least valuable part of the workshop?

The most common negative comment was in regard to time spent on loading data into EXCEL from spreadsheets. Others commented that the speakers did not stay on time, and one person suggested that this was due to the fact that one or two speakers presented material that was not new or useful to anyone who has been working the play. Others did not like the literature summaries presented by the two DOE speakers. This suggests that some of the attendees do not understand the value of previous shale research in this and other basins, which was a point of emphasis for this workshop.

#### Appropriateness of attendee fee (too low, about right, too high)?

Ninety percent thought the fee was about right; 8.5% thought it was too high. Usually, nearly 100% think our price is right.

#### All things considered, was the workshop worth your time & money (Y/N)?

Yes. Eighty two percent thought the workshop was well organized.

#### Will you be able to use the information received and in what time frame (now, near future, at some undefined future date)?

This question was not asked, but 23 of 50 repeat attendees stated that they have used information gained from previous workshops. Sixteen offered to share information on technology or best practices.

Individual Written Comments of Note:

- Top-Down modeling presentation was very interesting
- Try to bring representatives from oil companies to provide more recent data
- Once again very good program
- Great talks
- The re-configured room was a nice improvement
- Well logging section was a little unorganized. Spent too much time cut/paste in Excel. Pre-made spreadsheets would have saved time & helped workflow
- One or two speakers spoke more than they had material that mattered. Little truly new was presented for those of us who have been working Marcellus and other shales for a while but was good for newbies

Schedule:

Time	Topic	Presenter
<b>08:00 – 09:00</b>	Registration and coffee	
<b>09:00 – 09:15</b>	Welcome and Introductions	Richard Bajura, National Research Center for Coal and Energy
<b>09:15 – 10:15</b>	Short Course: Well Logging Analysis – Part 1	Timothy Carr, WVU Geology & Geography Department
<b>Break 10:15- 10:45 am</b>		
<b>1045 – 1145</b>	Short Course: Well Logging Analysis – Part 2	Timothy Carr, WVU Geology & Geography Department
<b>Lunch Break 11:45 am – 1:00 pm</b>		
01:00 – 01:30	Geologic Model of the Marcellus Shale	Tom Mroz, National Energy Technology Laboratory, DOE
01:30 – 02:10	Marcellus Resource Characterization and Environmental Issues	Daniel Soeder, National Energy Technology Laboratory, DOE
<b>Break 2:10 – 2:40 pm</b>		
02:40 – 03:10	Reservoir Modeling of Shale Plays – Lower Huron, Bakken and Marcellus, Part 1	Shahab Mohaghegh, WVU Petroleum & Natural Gas Engineering Department
03:10 – 03:30	Reservoir Modeling of Shale Plays – Lower Huron, Bakken and Marcellus, Part 2	Khashayar Aminian, WVU Petroleum & Natural Gas Engineering Department
03:30 – 04:00	Comparative Anatomy of the Marcellus and Barnett Shales	Richard Smosna & Kathy Bruner, WVU Geology & Geography Department
<b>Wrap Up 4:00 – 5:00 pm</b>		
04:00 – 05:00	Panel Discussion	All speakers

## List of Attendees

First Name	Last Name	Organization Name	Address	City	State	Postal Code
Brian	Panetta	Waco Oil & Gas	PO Box 397	Glenville	WV	26351
Tara R.	Miller	CTL Engineering of WV	733 Fairmont Ave	Morgantown	WV	26501
Jack	Ferenci	Dra-Surv, Inc	203 Colvin Run Rd	Grindstone	PA	15442
William G.	Zempolich	Atlas Energy	1550 Coraopolis Heights	Moon Township	PA	15108
Betsy	Suppes	Forgedale Consulting	905 R. Saint Clair Rd	Johnstown	PA	15905
Eric	Lewis	WV Geological & Economic Survey	1 Mont Chataeu Rd.	Morgantown	WV	26506
Jeff	Brown	CNX Gas	8317 Heron Circle	Ooltewah	TN	37363
Richard	Reardon	Highpointe Oil & Gas, LLC	255 Airport Road	Indiana	PA	15701
Thomas R.	Moore	Exco Resources	3000 Ericsson Drive, Ste. 200	Warrendale	PA	15086
Robin	Petrusak	Advanced Resources International	4501 Fairfax Dr, Ste. 910	Arlington	VA	22203
Teddy W.	Borawski	PA-DEPT of Conservation & Natural Resources	RCSOB PO Box 8552	Harrisburg	PA	17105
Nathan S.	Bennett	PA Dept of Conservation and Natural Resources	PO Box 8552	Harrisburg	PA	17105
John	Piekara	PA DCNR-Forestry	RCSOB 400 Market St. PO Box 8552	Harrisburg	PA	17105
Arianne	Proctor	PA- DCNR Marcellus Shale Program	PO Box 8552	Harrisburg	PA	17105
Tom	Wagner	Cabot Oil & Gas	5 Penn Center West	Pittsburgh	PA	15276
Adam	Haecker	Cabot Oil & Gas	5 Penn Center West, Ste. 401	Pittsburgh	PA	15276
John W.	Abshire	Cabot Oil & Gas	Five Penn Center West, Ste. 401	Pittsburgh	PA	15276
Gil	Draper	CNX Gas Company, LLC	105 Mitchell Rd., Ste. 104	Oak Ridge	TN	37830
Bryan J.	McConnell, P.G.	Skelly & Loy, Inc	3280 William Pitt Way	Pittsburgh	PA	15238
Eric	Klug	Slippery Rock University Student	2740 Warrendale-Bayne Rd	Sewickley	PA	15143
Meghan	Rice	Slippery Rock Univeristy Student	105F Grove City Road	Slippery Rock	PA	16057
William	Walko	Chesapeake Midstream Development	414 Summers St	Charleston	WV	25301
Chad	Cunningham	Energy Corporation of America	501 56th St SE	Charleston	WV	25304
Patrick	Federinko	Reource Technologies Corp	248 East Calder Way, Ste. 305	State College	PA	16801
Al	Taylor	Nomad Geosciences LLC	11429 Purple Beech Drive	Reston	VA	20191
Joe	Lemon	Phillips Production Company	502 Keystone Dr	Warrendale	PA	15086
Terry	Ward	Phillips Production Company	502 Keystone Dr	Warrendale	PA	15086
Kathy	Flaherty	ABARTA Oil & Gas Co, Inc	1000 Gamma Dr., Ste. 400	Pittsburgh	PA	15238

Junior	Jenkins	ABARTA Oil & Gas Co., Inc.	1000 Gamma Dr., Ste. 400	Pittsburgh	PA	15238
Dave	Adams	ABARTA Oil & GasCo., Inc.	1000 Gamma Dr., Ste. 400	Pittsburgh	PA	15238
Jeb	Rosenberger	Stone Energy	6000 Hampton Ctr, Ste. 13	Morgantown	WV	26505
Robert W.	Anderson	Independent Geologist	P.O. Box 1056	Washington	PA	15301
Melissa	Sager	CNX Gas Co., LLC	1000 Consol Energy Dr.	Canonsburg	PA	15317
Adam R.	Smith	CNX Gas Co. LLC	1000 Consol Energy Dr.	Canonsburg	PA	15317
Christopher D.	Odham	CNX Gas	1000 Consol Drive	Canonsburg	Pa	15317
Bob	Williamson	PDC Energy	120 Genesis Blvd	Bridgeport	WV	26330
Scott	McCleary	PDC Energy	120 Genesis Blvd	Bridgeport	WV	26330
Dan	Amrine	PDC Energy	120 Genesis Blvd	Bridgeport	WV	26330
Joe	Smith	PDC Energy	120 Genesis Blvd	Bridgeport	WV	26330
KC	Oren	GeoGraphix	PO Box 63	Frisco	CO	80443
Dan	Billman	Billman Geologic Consultants	PO Box 567, 402 Lincoln Ave.	Mars	PA	16046
Edward	Klammer	Great Oak Energy, Inc	637 Allegheny Ave., PO Box 445	Oakmont	PA	15139
Brad	Posner	Superior Well Services	2455 Crosswalk Ln	Newburgh	IN	47630
Gregory C.	Bank	Seneca Resources Corporation	300 Essjay Rd., Ste. 150	Williamsville	NY	14221
Thomas	Bardol	Seneca Resources Corp.	300 Essjay, Ste. 150	Williamsville	NY	14221
Daniel	Dieteman	Seneca Resources Corp	300 Essjay Rd., Ste. 150	Williamsville	NY	14221
Jason	Reed	Seneca Resources	300 Essjay Rd., Ste. 150	Williamsville	NY	14221
Jim	Mills	Atlas Energy	1550 Coraopolis Hts. Rd	Moon Twp	PA	15108
Jim	Wing	Atlas Energy	1550 Coraopolis Hts Rd.	Moon Twp	PA	15108
Catherine	Enomoto	US Geological Survey	12201 Sunrise Valley Drive, M5956	Reston	VA	20192
Michael	Carlson	Windsor Energy Inc.	1250 Patton Farm Road	Washington	PA	15301
Robert	Burger	Geotrace	101 Bradford Rd., Ste. 200	Wexford	PA	15090
Steven	Knapp	National Fuel Gas	6363 Main St	Williamsville	NY	14221
Drew	Waggnner	Triana Energy	900 Virginia St. E	Charleston	WV	25301
Mark L.	Brand	Triana Energy	900 Virginia St. E	Charleston	WV	25301
Dick	Beardsley	Triana Energy	900 Virginia St. E	Charleston	WV	25301
Bruce	Dean	Gilead Resources Company	7573 Barchester Avenue NW	North Canton	OH	44720
L. Robert	Heim	Ardent Resources, Inc	61 McMurray Rd., Ste. 204	Pittsburgh	PA	15241
Brad	Hina					
Jeff	McClure	USDA/NRCS	PO Box 363	Lost Creek	WV	26385

Joshua	Hull	National Energy Technology Laboratory	436 Clark St.	Morgantown	WV	26501
Dr. Michael M	Ghazizadeh	Booz Allen Hamilton	Ste. 700, 700 N Saint Mary's Street	San Antonio	TX	78205
Roy	Sexton	West Virginia University	508 Herman Avenue	Morgantown	WV	26505
Tyler	Spear	West Virginia Geological Survey	1 Mont Chataeu Rd	Morgantown	WV	26508
George Richard	Cline	George R. Cline- Timber Management Services	77 Stolze Rd.	Burgettstown	PA	15021
Susan C.	Kite	WVGES	1 Mont Chateau Rd	Morgantown	WV	26508
Dave	Boyer	Texas Keystone	560 Epsilon Drive	Pittsburgh	PA	15238
Jonathan	Brady	Texas Keystone, Inc	560 Epsilon Dr	Pittsburgh	PA	15238
Eric	Ober	Texas Keystone, Inc	560 Epsilon Dr	Pittsburgh	PA	15238
Greg	Wrightstone	Texas Keystone, Inc	560 Epsilon Drive	Pittsburgh	PA	15238
Josh	Riethmiller	Chief Oil & Gas	6051 Wallace Road Extension, Ste. 210	Wexford	PA	15090
Kelly	Sager	Chief Oil & Gas	6051 Wallace Road Extension	Wexford	PA	15090
Richard D.	Yancich	Consultant	2860 South 88 Road, PO Box 1	Dilliner	PA	15327
Susan	Pool	WVGES	1 Mont Chateau Road	Morgantown	WV	26508
Kerima	Haddad	Virginia Oil & Gas LLC	888 Oakwood Rd., Ste. 220	Charleston	WV	25314
Virginia	Hebert	Talisman USA	50 Pennwood Place	Warrendale	PA	15086
Thomas J.	Appleby	Discovery Natural Resources LLC	298 Lancewood Place	Greensburg	PA	15601
Rick	Cisler	Petroleum Geologist	4326 Sintz Rd	Springfield	OH	45504
Katie	Mammone	Student				
Larry	Kerns		2406 Plum St	Parkersburg	WV	26101
B.J.	Carney	Northeast Natural Energy	707 Virginia St. East. Ste. 1400	Charleston	WV	25301
Adam	Sholes	Mountaineer Gas Services	2480 Thorofare Rd	Clendenin	WV	25045
John	Interval		3121 Laurel Ridge Circle	Bridgeville	PA	15017
Thomas	Rice	Consulting Engineering Geologist	148 Main Stree	Wellsboro	PA	16901
Jeffery	Robb		6990 Canal Road NE	Dover	OH	44622
Scott	Austen	Hanley & Bird, Inc.	2560 Route 39	Brookeville	WV	15825
Adam	Rac	Slippery Rock University Student	14 Laver Road	Greenville	PA	16125
Tim	Carr	WVU Geology & Geography Department		Morgantown	WV	26506
Tom	Mroz	National Energy Technology Laboratory- DOE		Morgantown	WV	
Dan	Soeder	National Energy Technology Laboratory- DOE		Morgantown	WV	26505
Shahab	Mohaghegh	WVU Petroleum and Natural Gas Engineering		Morgantown	WV	26506



Khashayar	Aminian	WVU Petroleum & Natural Gas Engineering		Morgantown	WV	26506
Richard	Smosna	WVU Geography and Geology Department		Morgantown	WV	26506
Kathy	Bruner	WVU Geography and Geology Department		Morgantown	WV	26506
Paul	Orlando	Nitor Tenchonologies	2750 Constitution Blvd	Beaver Falls	PA	15010
Woody	Lutz	Atlas Energy, Inc	1550 Coraopolis Ht's Rd	Moon Township	PA	15108
Jeff	Greenawalt	Susquehanna Exploration & Production	1164 School Street	Pittsburgh	PA	15220
Bob	Trevail	Dallas Energy, LLC	168 Wolfe Run Road	Freedon	PA	15042
Keith	Mangini	Huntley & Huntley, Inc	Penn Office Building, Ste. 100 4312 Old William Penn Highway	Monroeville	PA	15146
Courtney	Rubin	Student	2040 University Ave, Apt. 402	Morgantown	WV	26505
Anthony	Johnson	Consol Gas		Jane Lew	WV	
John	Tellers	Consol Gas		Jane Lew	WV	

EVALUATION (return to coordinator at conclusion of workshop)

Petroleum Technology Transfer Council Appalachian Region Workshop

*“Marcellus Shale Resource Assessment and Logging School”  
November 17, 2010*

1. How did you hear about the workshop?  

<u>3</u>	Direct mailing	<u>0</u>	Periodical	<u>1</u>	Phone
<u>55</u>	E-mail	<u>9</u>	Internet/www	<u>8</u>	Other
  
2. What additional topics would you like to see in future Focused Technology Workshops? **See other page**
  
3. Are you a(n):  

<u>41</u>	Operator (field supervisor, geologist, engineer)
<u>5</u>	Service Company employee
<u>18</u>	Consultant
<u>0</u>	Educational Institution employee
<u>8</u>	State/Federal Government employee
<u>4</u>	Students
  
4. Please circle the response that best indicates your agreement, with 5 being the strongest:  

A) The program met my expectations	5	4	3	2	1
	<b>18</b>	<b>39</b>	<b>13</b>	<b>2</b>	<b>0</b>
B) The speakers/facilities were acceptable	5	4	3	2	1
		<b>29</b>	<b>39</b>	<b>13</b>	<b>0</b>
C) The program was well organized	5	4	3	2	1
		<b>30</b>	<b>29</b>	<b>9</b>	<b>4</b>
  
5. The workshop fee was: 1 too low      64 OK      6 too high
  
6. Additional comments: (Please use back of page if needed).  

**See other page**
  
7. Please indicate which tech transfer method is most helpful to you. Rank from 1 to 5, with 5 being the most helpful:  

Workshop	5	4	3	2	1
	<b>35</b>	<b>12</b>	<b>5</b>	<b>3</b>	<b>8</b>
Individual assistance	5	4	3	2	1
		<b>21</b>	<b>11</b>	<b>10</b>	<b>4</b>
Reports/Case studies	5	4	3	2	1
		<b>7</b>	<b>19</b>	<b>15</b>	<b>13</b>
Internet	5	4	3	2	1
	<b>7</b>	<b>9</b>	<b>23</b>	<b>12</b>	<b>3</b>
Newsletters	5	4	3	2	1
	<b>3</b>	<b>12</b>	<b>7</b>	<b>15</b>	<b>18</b>
  
8. Have you attended other PTTC events? 50 Yes (how many?) 15 No

Have you used any new technologies based on knowledge gained through PTTC events? 23 Yes 30 No  
If yes, please describe (in general) the application/results. (PTTC will only use your response with your permission.)

**See other page**

9. Would you be willing to share with others any technology innovations or best practices?  
16 Yes 24 No If yes, briefly list topics/information you are willing to share. **See other page**

**2. What additional topics would you like to see in future Focused Technology Workshops?**

More in depth log analysis class  
Saturation calculations  
Advances log analysis  
Production Operations- Fluid Removal/ horizontal Marcellus Wells  
Horizontal drilling, casing, and fracturing  
Permitting, water & disposal  
Mechanics of Marcellus Shale Drilling and fracturing  
Evaluation of fracturing techniques in actual wells  
Flowback and produces water treatment  
Additional shale presentations with production history data  
Seismic, more logging  
Shale calculations/SW  
Water saturation via logs, TOV approximation, rock mechanics

**6. Additional Comments:**

- Downloads necessary for log analysis workshop should have been available before workshop, to be loaded and reviewed before arrival
- Need to stay on time
- Did not need such a long lunch
- Nice if the morning session was given more time and in a computer lab with data pre-loaded
- The slides were hard to read- white on white- handouts did not turn out.
- Also the web address was not left on the screen long enough to write it down.
- I don't remember the original program description discussing the need for a laptop. The follow up email on the laptops was sent out after the refund date. I think I'll look back at my emails.
- Mr. Mroz went so far over I was unable to stay and hear Dr. Smosna and Dr. Bruner's presentation which I was very interested in.
- The re-configured room was a nice improvement
- Should stress to the speakers to stay relatively close to their allotted time slot to avoid other speakers having to rush through their presentations
- Shorten lunch break
- Well logging section was a little unorganized. Spent too much time cut/paste in Excel. Pre-made spreadsheets would have saved time & helped workflow
- Disappointed that the water saturation calculation was not discussed
- Top-Down modeling presentation was very interesting
- Try to bring representatives from oil companies to provide more recent data
- Once again very good program
- Great talks
- One or two speakers spoke more than they had material that mattered. Little truly new was presented for those of us who have been working Marcellus and other shales for a while but was good for newbies
- Really good presentation, nice job
- I would like to hear more petrophysics and less literature (DOE surveys)
- Too much time wasted on loading excel data and not working with model/spreadsheet results

- Spreadsheet unstable in Excel 2007

**8. Have you used any new technologies based on knowledge gained through PTTC events?**

Geochem study

Log Analysis

Software apps

Marcellus info and other logging info

Results were positive

Sequence stratigraphy

Petroleum systems

Utilizing electronic data collections for productions reporting

Advanced logging tools, sonic, dipole sonic, etc.

**9. Topics/info willing to share.**

- John Interval- Production Management
- Paul Orlando- Gas Leak Detection and location
- Tara Miller- Log Analysis