Coal Bed Methane and Shale Gas Evaluation & Development

Optimize your CBM and Shale Gas Evaluation and Development By Learning Best Practices!

Date: 05th October 2015 - 09th October 2015
Location: Kuala Lumpur, Malaysia

Steve Hennings
- Has over 30 years of field and reservoir experience in a large number of basins, covering every phase of development
- Principal Consulting Engineer of Source Rock Engineering
- Expert all phases of Coalbed Methane and Coal Mine Methane development and on reviving Mature Oil and Gas fields
- Teach public Shale Gas and CBM courses for the international Society of Petroleum Engineers

Course Objectives
- Review the key differences in evaluating and developing CBM, Shale and Conventional Reservoirs
- Understand what determines the commercial potential of a particular CBM play
- Review the common features of the most successful plays and why each play has required a unique development approach
- Become familiar with the terminology, technology and emerging trends
- Review the process of calculating resource volumes, identifying the best development areas, forecasting recoveries, estimating cash flow and determining reserves

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PetroSync understands that in current economic climate, getting an excellent return on your training investment is critical for all our clients. This excellent training can be conducted exclusively for your organization. The training can be tailored to meet your specific needs at your preferred location and time. We will meet you anywhere around the globe.

If you like to know more about this excellent program, please contact Jerry Tay (Conference Director) on +65 6415 4502 or email jerry.t@petrosync.com
This 5-day course is designed for technical professionals involved in evaluating or developing unconventional gas reservoirs. Unconventional reservoirs represent the largest gas resource in the world and in the past few years they became the major source of natural gas production in North America. As a result, unconventional reservoirs are now receiving a tremendous amount of attention from various countries, oil & gas companies, and investors. Almost all of the university and industry training is directed at conventional reservoirs and so many professionals in the industry are eager to gain a better understanding of the unique terms and concepts involved in evaluating and developing unconventional reservoirs.

The first three days of the course will focus primarily on gas development from Coal (CBM, CSG, CSM) and the final two days will focus on developing Shale Gas. In addition, the evaluation methods for Shale Gas combine methods from Coal, Oil and Tight reservoir development and so attendees will also gain a good understanding of a variety of different ongoing plays and the methods applied to each type of unconventional reservoir.

Class examples are planned for each day and so attendees will need to bring either a laptop or calculator to solve simple equations. The case studies and class examples will present the steps to determining; resource volumes, maximum allowable investments, recovery factors, specific well locations, appropriate hydraulic frac size, and reserve volumes for unconventional reservoirs. The data for the example problems will come from actual development projects, primarily those where the instructor has been involved, to help illustrate the quality and types of data usually available for evaluation.

Attendees are assumed to have a reasonably good understanding of terms and methods applied in the development of conventional oil and gas fields as the course will focus on those items that are fairly unique to unconventional reservoirs.

This course is designed for
- Reservoir Engineer
- Petroleum Engineer
- Geologist
- Geophysicist
- Managers

Steve Hennings

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Steve Hennings is the Principal Consulting Engineer for Source Rock Engineering in Littleton, Colorado. He has over 30 years of field and reservoir experience in a large number of basins, covering every phase of development. His focus for the past decade has been on coal gas, coal mine methane and shale gas development.

He has been involved in technical evaluations of development and exploration prospects in all over the world. In 2008, Hennings was awarded the prestigious annual Stefanko Award from the Society of Mining Engineers for his technical contributions. Hennings is a registered professional engineer. He holds a BS in petroleum engineering and an MS in finance.

CLIENT LIST
Course Agenda

DAY 1  Unique Keys to CBM
- Emergence and Status of Coal Gas
- Determining Net Coal
- Adsorption Isotherms
- Level of Maturity
- Gas Composition Variability
- Coal Stress and Continuity
- Log Responses in Coal
- Core Analysis
- Coal Permeability
- Production Characteristics
- Class Exercise - Calculating Permeability in Coal
- Water Issues

DAY 2  Evaluating CBM Commercial Potential
- Relative Permeability
- Permeability Anisotropy
- Horizontal Well Design
- Development Considerations
- Gas Resource Analysis
- Case Study - Due Diligence on Published Gas-in-Place
- Class Exercise - Calculating Gas Resource Volumes in Coal
- Gas Content Analysis
- Gas Saturation
- Case Study - Gas Saturation Variability
- Class Exercise - Determining Maximum Recovery Factors
- Vertical Well Design
- Economic Analysis for Resource Plays
- Completion Options

DAY 3  Forecasting Revenue from CBM
- Impact of Pressure Drawdown
- Pilot Well Objectives
- Class Exercise - Pilot Well Drawdown Schedule
- Production Variations
- Class Exercise - Forecasting Peak Gas Rate
- Case Study - Production Correlations
- Workovers
- Production Forecasting Methods
- Reserve Estimation
- Class Exercise - Calculating Gas Reserves in Coal
- Global Activities
- Group Exercise on Coal Nomenclature
Course Agenda

DAY 4 Unique Keys to Shale Development
• Emergence of Shale
• Key Shale Properties
• Geologic Factors
• Evaluation Concepts
• Adsorption plus Absorption
• Class Exercise - Absorbed Gas-in-Place
• Development Windows
• Pyrolysis Analysis
• Class Exercise - Shale Oil Resource Volume
• Log Responses in Shale
• Exploration Objectives
• Class Exercise - Calculating Recovery Factors
• Development Overview

DAY 5 Essential Completion Technology for CBM and Shale
• Hydraulic Fracturing Technology
• Fracturing Fluid Additives
• Well Design Overview
• Treatment Monitoring
• Environmental Issues
• Exploration Differences from Conventional Reservoirs
• Group Discussion - Key Development Issues
• Completion Options
• Case Studies - Production Correlations
• Class Exercise - Basic Frac Design
• Rate Forecasting Methods
• Group Exercise on Shale Nomenclature
• Current Trends and Future Opportunities

PROGRAM SCHEDULE

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>08:00</td>
<td>Registration (Day 1)</td>
</tr>
<tr>
<td>09:00</td>
<td>Session I</td>
</tr>
<tr>
<td>11:00</td>
<td>Refreshment &amp; Networking Session I</td>
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<tr>
<td>11:15</td>
<td>Session II</td>
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<tr>
<td>13:00</td>
<td>Lunch</td>
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<tr>
<td>14:00</td>
<td>Session III</td>
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<tr>
<td>15:30</td>
<td>Refreshment &amp; Networking Session II</td>
</tr>
<tr>
<td>15:45</td>
<td>Session IV</td>
</tr>
<tr>
<td>17:00</td>
<td>End of Day</td>
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</tbody>
</table>
# Programme Consultant

**Name:** Cay Aagen  
**Email:** registration@petrosync.com  
**Phone:** +65 6415 4500  
**Fax:** +65 6826 4322

# Terms and Conditions

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You may substitute delegates at any time as long as reasonable advance notice is given to PetroSync. For any cancellation received in writing not less than fourteen (14) working days prior to the training course, you will receive a credit voucher less a SGD $200 administration fee and any related bank or credit card charges.

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**Certificate of Attendance:**
70% attendance is required for PetroSync’s Certificate of Attendance.

**Charges & Fee(s):**
- For Payment by Direct Telegraphic Transfer, client has to bear both local and overseas bank charges.
- For credit card payment, there is additional 4% credit card processing fee.

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# Programme Details

**Title:** Coal Bed Methane and Shales Evaluation & Development  
**Date:** 05th - 09th October 2015  
**Location:** Kuala Lumpur, Malaysia

# Investment Packages

Please circle the package that you are attending!

<table>
<thead>
<tr>
<th>Investment Package</th>
<th>Deadline</th>
<th>5 DAYS MASTERCLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Price</td>
<td>2nd Oct 2015</td>
<td>SGD $ 5,995</td>
</tr>
<tr>
<td>Early Bird Offer</td>
<td>4th Sept 2015</td>
<td>SGD $ 5,795</td>
</tr>
<tr>
<td>Group Discount (3 or more Delegates)</td>
<td>2nd Oct 2015</td>
<td>10% discount for groups of 3 registering from the same organization at the same time</td>
</tr>
</tbody>
</table>

* To enjoy the promotion & discount offer, payment must be made before deadline
* For 5 or more delegates, please inquire for more attractive package.
* Prices include lunches, refreshments and materials. Promotion & discount cannot be combined with other promotional offers.
* Important: Please note that registration without payment will incur a SGD 200 administration fee.

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# Delegates Details

**1st Delegate Name:**  
**Direct Line Number:**  
**Job Title:**  
**Head of Department:**  
**Email:**

**2nd Delegate Name:**  
**Direct Line Number:**  
**Job Title:**  
**Head of Department:**  
**Email:**

**3rd Delegate Name:**  
**Direct Line Number:**  
**Job Title:**  
**Head of Department:**  
**Email:**

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# Invoice Details

**Attention Invoice to:**  
**Direct Line Number:**  
**Fax:**  
**Company:**  
**Industry:**  
**Address:**  
**Country:**  
**Postcode:**  
**Email:**

Please note:
- Indicate if you have already registered by Phone  
- Fax  
- Email  
- Web  
- If you have not received an acknowledgement before the training, please call us to confirm your booking.

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# Payment Methods

- By Credit Card:
  - Please debit my credit card:  
  - Visa  
  - MasterCard  
  - AMEX  
  - Security Code:  
  - Card Number:  
  - Expiry Date:  

- By Direct Transfer:
  - Please quote invoice number(s) on remittance advice

PetroSync Global Pte Ltd Bank details:
- **Account Name:** PetroSync Global Pte Ltd  
- **Bank Name:** DBS Bank Ltd  
- **Bank Code:** 7171  
- **Bank Swift Code:** DBSSSGSGXXX  
- **Branch code:** 288  
- **Account No.:**  
- **SGD:** 2889018980  
- **USD:** 0288002682016  
- **Bank Address:** 12 Marina Boulevard, Level 3, Marina Bay Financial Centre Tower 3, Singapore 018982  
All bank charges to be borne by payer. Please ensure that PetroSync Global Pte Ltd receives the full invoiced amount.

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**Confirmation**:  
I agree to PetroSync’s terms & conditions, payment terms and cancellation policy.

Authorized Signature:  
**Payment Terms:** Payment is due in full at the time of registration. Full payment is mandatory for event attendance.