Naturally Fractured Reservoir Characterization

Learn the Practical Aspects of Reservoir Characterization in Naturally Fractured Reservoir for Optimum performance!

Date : 17th November - 21st November 2014
Location : Jakarta, Indonesia

Petrosync Distinguished Lecturer

Dr. Djebbar Tiab
Owner & GM, United Petroleum Technology LLC
Professor of Petroleum Engineering, University of Oklahoma

- Over 35 years of experience in the Oil & Gas industry
- Consulted & Trained for Oil & Gas companies in the USA, Africa, Middle East & Asia
- Author of several publications and numerous SPE technical papers

Course Objectives

- Integrate rock data obtained from logs and cores
- Generate permeability-porosity relations unique to their reservoir
- Utilize data from formation evaluation tools to determine reservoir quality
- Identify and characterize flow units
- Analyze the variations in pore architecture and its effect on permeability
- Relate fracture density, aperture, and length to facies, lithology and digenesis
- Determine fracture porosity and permeability in NFR
- Calculate Porosity partitioning coefficient of a naturally fractured reservoir
- Calculate storage capacity and inter-porosity flow factor
- Analyze well tests in naturally fractured reservoirs
- Assess reservoir performance of horizontal wells in NFR
- Use MBE to analyze impact of pressure Depletion on Recovery

Supported by
This course stresses practical aspects of reservoir characterization for reservoir and production engineers, with a special emphasis on:

· Assessing recovery and reserves
· Petrophysical evaluation of naturally fractured Fractured (NFR)
· Rock typing, reservoir zoning and flow units
· Interpretation of pressure tests of vertical and horizontal wells in NFR
· Reservoir management for optimum performance

This course is intended for:

Petroleum engineers, such as production engineers, reservoir engineers, and other technical staff who are involved in the area of reservoir management, formation evaluation and field development

Dr. Djebbar Tiab is the senior Professor of Petroleum Engineering at the University of Oklahoma (OU). He received his B.Sc. (May 1974) and M.Sc. (May 1975) degrees from the New Mexico Institute of Mining and Technology, and Ph.D. degree (July 1976) from the University of Oklahoma - all in Petroleum Engineering, with a minor in mathematics. He served as the Director of the “OU Graduate Program in Petroleum Engineering in Algeria” from 1996 to 2004.

He worked for over two years in the oil fields of Algeria for Alcore, S.A., an association of Sonatrach and Core Laboratories. He has also worked and consulted for Core Laboratories and Western Atlas in Houston, Texas, for four years (1990-1993) as a Senior Reservoir Engineer Advisor. He is the owner and General Manager of the consulting and training company UPTEC (United Petroleum Technology, LLC), based in Norman, Oklahoma. Dr. Tiab has consulted for a number of oil companies and offered training programs in petroleum engineering in the U.S.A. and overseas.

He received the 1995 SPE Distinguished Achievement Award for Petroleum Engineering Faculty. The citation read, “He is recognized for his role in student development and his excellence in classroom instruction. He pioneered the pressure derivative technique of well testing and has contributed considerable understanding to petrophysics and reservoir engineering through his research and writing.”

Dr. Tiab was elected in October 2002 as a member of the Russian Academy of Natural Sciences because of “His outstanding work in petroleum Engineering”, and was awarded the Kapista gold Medal of Honor for “His outstanding contributions to the field of engineering.”

He received the 2003 SPE Formation Evaluation Award for “Outstanding achievements in petrophysics and reservoir engineering.” He was nominated for the 2013 SPE Reservoir Description and Dynamics Award.
DAY 1
PETROPHYSICAL EVALUATION OF NATURALLY FRACTURED RESERVOIRS

• Evaluation of Naturally Fractured Reservoirs (VIDEO)
• Indicators of Natural Fractures, Visual Identification of Fractures
• Fracture Porosity Determination
• Porosity Partitioning Coefficient, Fracture Intensity Index
• Permeability-Porosity Relationships
• Fracture Porosity and Aperture from Cores
• Fracture Area, Fracture Storage Capacity, Fracture Conductivity
• Cementation Factor in NFR
• NMR Response Characteristics in NFR
• Petrophysical Characteristics for Use in Dual-Porosity Simulators
• EXERCISES

DAY 2
ASSESSING RESOURCES, RESERVES & RECOVERY

• R/P Ratio: DNA of a Company
• Petroleum Reserves: Definitions
• Estimating Oil in place
• Recovery Efficiency and Reserves of Under-saturated Reservoirs
• Recovery Efficiency and Reserves of Saturated Reservoirs
• Estimating Reserves of a Water Drive Reservoir
• Impact of Drive Mechanism on Recovery (VIDEO)
• Estimating Gas Reserves
• Recovery Efficiency, API Correlations
• Fluid Contacts
• Residual Oil Zone and Transition Zone
• EXERCISES

DAY 3
ROCK TYPING, RESERVOIR ZONING & FLOW UNITS

• Reservoir Environments & their Characteristics (VIDEO)
• Permeability-Porosity Models
• Identification & Characterization of Flow Units in Clean Formations
• Flow units in clean sands, flow zone index
• Reservoir characterization by the J-function
• Identification & Characterization of Flow Units in Shaly Formations
• Log-derived evaluation of shaly sands
• Flow units in shaly formations, shale zone index
• Reservoir Quality Index for Fractured Systems
• Permeability Averaging Techniques
• Porosity Averaging Techniques
• EXERCISES
NET-PAY CUT-OFF, WINLAND R35 & FLOW UNITS

- Determining Net-Pay Cut-Off
- Winland R35 Net-Pay Cut-off
- Cut-Off Determination in Low Permeability Sands
- The Pittman-Apex Net-Pay Cut-Off Method
- Net-Pay Cut-Off In Carbonate Rocks
- Flow Unit: Winland R35, RQI, FZI and FFI
- Flow Unit: Pittman-Apex, RQI, FZI and FFI
- Limitations of Petrophysical Evaluation
- EXERCISES

DAY 4 MODERN WELL TEST ANALYSIS IN NATURALLY FRACTURED RESERVOIRS

- Fundamentals of WTA & Test Design (VIDEO)
- Pseudo-steady state Flow Model
- Transient Matrix Flow Model
- Anisotropic reservoirs & Interference testing
- Composite NFR
- EXERCISES

PERFORMANCE OF HORIZONTAL WELLS IN NFR

- Geological Aspects of Horizontal Wells (VIDEO)
- Horizontal well applications
- Overview of Horizontal Wells
- Limitations of Horizontal Wells
- Importance of Vertical Permeability to HW Performance
- Objectives of HW in Naturally Fractured Reservoirs
- Horizontal Well Test Analysis
- Horizontal Wells in Anisotropic NFR
- EXERCISES

IN-HOUSE SOLUTIONS
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If you like to know more about this program, please contact us on +65 6415 4500 or email general@petrosync.com
RESERVOIR MANAGEMENT OF NFR

- MBE for Dual-Porosity systems
- Naturally Fractured Gas Reservoirs
- Undersaturated NFR
- Saturated NFR
- Reservoir Management Of Mature Fields (VIDEO)
- Reservoir Description & History Matching
- Study Objectives, History Matching
- Integration of well test Data in reservoir characterization
- Performance of water-flood in NFR
- EOR For NFR
- EXERCISES

PROGRAM SCHEDULE

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>08:00 – 09:00</td>
<td>Registration (Day1)</td>
</tr>
<tr>
<td>09:00 – 11:00</td>
<td>Session I</td>
</tr>
<tr>
<td>11:00 – 11:15</td>
<td>Refreshment &amp; Networking Session I</td>
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<tr>
<td>11:15 – 13:00</td>
<td>Session II</td>
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<tr>
<td>13:00 – 14:00</td>
<td>Lunch</td>
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<tr>
<td>14:00 – 15:30</td>
<td>Session III</td>
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<tr>
<td>15:30 – 15:45</td>
<td>Refreshment &amp; Networking Session II</td>
</tr>
<tr>
<td>15:45 – 17:00</td>
<td>Session IV</td>
</tr>
<tr>
<td>17:00</td>
<td>End of Day</td>
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- PetroSync programs focus on your immediate working issues to ensure that you are able to apply and deliver immediate results in real work situations.
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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>14th Nov 2014</td>
<td>SGD $ 5,995</td>
</tr>
<tr>
<td>Early Bird Offer</td>
<td>17th Oct 2014</td>
<td>SGD $ 5,795</td>
</tr>
<tr>
<td>Group Discount (3 or more Delegates)</td>
<td>14th Nov 2014</td>
<td>10% discount for groups of 3 registering from the same organization at the same time</td>
</tr>
</tbody>
</table>

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**DELEGATES DETAILS**

1st Delegate Name________________________ Mr  □  Mrs  □  Ms  □  Dr  □  Others  □
Direct Line Number: ______________________ Email: ______________________________________________________
Job Title: __________________________________ Department: _____________________________________________
Head of Department: ________________________

2nd Delegate Name________________________ Mr  □  Mrs  □  Ms  □  Dr  □  Others  □
Direct Line Number: ______________________ Email: ______________________________________________________
Job Title: __________________________________ Department: _____________________________________________
Head of Department: ________________________

3rd Delegate Name________________________ Mr  □  Mrs  □  Ms  □  Dr  □  Others  □
Direct Line Number: ______________________ Email: ______________________________________________________
Job Title: __________________________________ Department: _____________________________________________
Head of Department: ________________________

**INVOICE DETAILS**

Attention Invoice to: ____________________________________________________________
Fax: +65 6826 4322
Phone  : +65 6415 4500
Email   : registration@petrosync.com
Name  : Cay Aagen
Phone   : +65 6415 4500
Fax : +65 6826 4322
Email    : registration@petrosync.com
Company: __________________________________________ Industry: ____________________________
Address: __________________________________________________________ Postcode: ________________
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- 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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- By Credit Card : □ Visa □ MasterCard □ AMEX Security Code: __________
Card Number: __________-________-________-________ Expiry Date: __________
Name printed on card: __________________________

- By Direct Transfer : Please quote invoice number(s) on remittance advice
PetroSync LLP Bank details:
Account Name: PetroSync LLP
Bank Number: 7144 • Branch Code: 001 • Account No: 010-2255-105
Name of Correspondent Bank: Standard Chartered Bank, 6 Battery Road, Singapore 049909
SWIFT Code of Correspondent Bank: SCBLSGSGXXX
All bank charges to be borne by payer. Please ensure that PetroSync LLP receives the full invoiced amount.

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A minimum of 70% attendance is required prior issuance of PetroSync's Certificate.

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By Credit Card : □ Visa □ MasterCard □ AMEX Security Code: __________
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Name printed on card: __________________________

- For Payment by Direct TelegraphicTransfer, client has to bear both local and oversea bank charges.
- For credit card payment, there is additional 4% credit card processing fee.

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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.