Advanced Basin Analysis for Petroleum Prospectivity

A practical and effective approach to analyse petroleum-bearing sedimentary basins with maximum effect

14-16 April, 2011
At SRK Consulting, 10 Richard St, West Perth, WA

Key learning outcomes

SYSTEMATICALLY assess a basin evolution process, integrating geology, geophysics and petroleum geochemistry

IMPROVE the accuracy of basin evaluation and reservoir assessment

EVALUATE the fundamentals controlling a basin’s burial and thermal history through tectonic subsidence analysis

UNDERSTAND hydrocarbon migration and charging

CHARACTERISE the essentials of reservoir and seal quality

MASTER basin modeling and UNDERSTAND various key aspects of source rocks and hydrocarbon potentials, including analytical methods, maturation and hydrocarbon expulsion modeling

DEVELOP a successful basin evaluation and exploration strategy to enhance project profitability

PREDICT and EVALUATE petroleum systems and hydrocarbon resources in sedimentary basins

IDENTIFY critical risk factors and how to address them effectively
Workshop overview

• This course aims to remind the practicing petroleum geologist, and others working in the hydrocarbon exploration and production, of the main principles of each of these different disciplines, and to show how they may be brought together to provide an understanding of all types of sedimentary basins, and the petroleum systems that lie within them.
• Shows how this understanding may be used to predict where, in what quantities and of what type, hydrocarbons may be found within a basin.
• Will cover more advanced topics designed for those who have already gained significant experience in the field. The learning will be accentuated through case studies and discussions and you will have many opportunities to share your challenges and opinions about basin analysis.

Course facilitators

Dr. Bruce McConachie, Principal Consultant (Petroleum Geology), SRK Consulting
Bruce has over 25 years’ experience in basin analysis, evaluation and exploration.

Dr. Peter Stuart-Smith, Principal Consultant (Structural Geology), SRK Consulting
Peter has 35 years’ experience as a regional geologist and has worked in Australasia, Southeast Asia, North Africa the Middle East and South America). He specialises in structure and tectonics.

Dr. Mark KeYang Ma, Senior Consultant (Petroleum Geology), SRK Consulting
Mark has 20 years regional geology, basin analysis and modelling experience

Who should attend

• Basin Management & Analysts
• Exploration Professionals
• Geologists
• Geophysicists
• Geoscientists
• Petroleum Engineers
• Reservoir Engineers
• Risk Management
• Research and Development
• Project Support and Services
This course will also bring value to: O&G Operators, Exploration Contractors, Drilling Contractors & O&G Service Providers

Why you should attend

• This is highly impactful training session to supply you with effective and thorough understanding and practical training in basin analysis for petroleum exploration.
• The facilitator team includes three highly experienced PhD regional geologists specialized in basin analysis and resource evaluation with an admirable record of basin analysis projects all over the world including Australia, Southeast Asia, Middle East and North Africa.
• The facilitator team will bring to you practical and useful techniques about basin modelling, quantitative risk assessment that can assist in corporate decision making and save your organization millions of dollars in exploration costs.
• You will gain knowledge about petroleum systems, hydrocarbon migration and charging, burial and thermal history, play and prospect analysis as well as strategise your basin resource evaluation activities.
• Via a series of illustrations and real life case studies you will gain a new set of perspectives and practical tools
About your course facilitators

**Dr. Bruce McConachie**, BSc (Geology), BSc (Chemistry), PhD, Principal Consultant (Petroleum Geology) has over 25 years’ experience in economic resource evaluation and exploration for oil and gas. He has extensive seismic interpretation and petroleum basin analysis experience including risking plays and prospects. Bruce has undertaken regional, structural, stratigraphic and seismic analysis of East Java, West Papua and Central Sumatra Basins in Indonesia, Papuan Basin in Papua New Guinea, Beibu Gulf in the South China Sea, McArthur and Mount Isa Basins; Petrel Sub Basin, Carpentaria Basin, Bowen Basin, Arckaringa Basin and Officer Basin Australia plus the Williston Basin Canada and Cesar Basin Columbia. His experience includes exploration, production testing and field development roles for many companies and joint ventures and he has operational experience from over 50 wells.

Bruce completed a Masters degree on regional basin analysis of the northern Bowen Basin (coal focus) and a PhD on basin analysis and economic geology of the northern Mount Isa Basin (petroleum focus) both located in Australia. He is a member of the American Association of Petroleum Geologists, Petroleum Exploration Society of Australia and the Australasian Institute of Mining and Metallurgy.

**Dr. Peter Stuart-Smith**, BA (Hons), MSc (Mining and Exploration Geology), PhD, Principal Consultant (Structural Geology) has more than 35 years experience in the petroleum/ mineral industry. His experience includes a broad range of geological projects, encompassing areas such as structural geology, geophysics, stratigraphy, petrology, geochemistry, geochronology and economic geology, and he specialises in basement structure and tectonics, basin architecture and basin analysis.

Peter has worked on projects in Australasia, Southeast Asia, North Africa / Middle East and South America including a national-scale (e.g. Australia, Egypt, Libya, Oman, South East Asia) for the petroleum industry and government. He has also carried out prospectivity and geological assessment studies for a range of petroleum companies at concession-scale in Mali, Libya, Egypt and Southeast Asia. Studies undertaken have provided new views of the architecture of sedimentary basins, via the development of a structurally enhanced view of the basement. Peter is a member of the Australasian Institute of Mining and Metallurgy, Geological Society of Australia and the Petroleum Exploration Society of Australia.

**Dr Mark KeYang Ma**, BSc (Geology), MSc (Applied Petroleum Geology), PhD, Senior Consultant (Petroleum Geology) has 20 years industry experience, having worked in many basins / petroleum fields and has expertise in regional geology, basin analysis and modelling; and the application of essential geological, geochemical, geophysical and seismic interpretation tools, and industry geo-software. Mark’s expertise covers petroleum geochemistry, petroleum system elements, hydrocarbon potential, migration and charging, and exploration prospectivity analysis; prospect/play generation and evaluation and ranking. Mark is a member of the SE Asian Petroleum Exploration Society, Petroleum Exploration Society of Australia.

SRK Consulting is a corporate member of the Australian Petroleum Production & Exploration Association. Collectively the course facilitators have over 80 years’ experience as regional geologists in the international oil and gas industry. As consultants at SRK’s Australasia practice they offer a variety of geological services to oil and gas exploration and mining companies. Their client base includes many of the world’s major and minor oil and gas companies including:

- BHP Billiton Petroleum Ltd
- Santos
- Petroleum Development Oman
- BP Amoco
- Papua Petroleum Limited
- Shell International Exploration and Production
- Repsol YPF
- BP Exploration
- Apache
- Australian Government Geoscience Australia
3 Day Course Outline

**DAY 1 - 14 April 2011**

**TYPES OF SEDIMENTARY BASINS AND THEIR CHARACTERISTICS**
- Rift basins
- Passive-margin basins
- Active-margin basins
- Transform/strike-slip basins
- Intracontinental basins
- Syn-orogenic & post-orogenic basins

**DATA SOURCES AND PROCESSING**
- Interpretation of multiple datasets (data mining)
- Seismic, geochemical and well data

**BASIN ARCHITECTURE AND POTENTIAL FIELD DATA SETS**
- Processing and enhancement of magnetic data
- Processing and enhancement of gravity data
- Integrated non-seismic and seismic interpretations
- Regional structural evolution

**BASIN ANALYSIS AND THE PETROLEUM SYSTEM**
- Basin frameworks
- Sequence stratigraphy and modeling
- Thermal history and maturity
- Palaeo-thermometers: organic and mineral
- Source rocks and generation
- Reservoirs
- Seals and traps
- Migration and charging
- Timing and the critical moment
- Hydrocarbon preservation

**PETROLEUM GEOCHEMISTRY**
- Recognizing the elements and significance
- Samples and methods of study - Liquid chromatography, Gas chromatograph-mass spectrometer (GC-MS) analysis, Gas chromatograph (GC), Gas chromatograph, Atomic emission detection system (GC-AED) analysis

**BASIN FILL & DEPOSITIONAL ENVIRONMENTS**
- Evaluating hydrocarbon discoveries clastic systems
  Case study: hydrocarbon field 1 clastic reservoir
- Evaluating hydrocarbon discoveries carbonate systems
  Case study: hydrocarbon field 2 carbonate reef

**DAY 2 - 15 April 2011**

**BURIAL HISTORY AND COMPACTION**
- Pressure build-up: lithostatic, hydrostatic and overpressures
- Thermal evolution
  - Sources of heat
    - Conduction & convection
    - Influence of lithology and structure/faulting
- Formation fluid evolution
- Porosity and permeability evolution

**TERRANE ANALYSIS – FROM THE BASEMENT UP**

**INTRABASINAL BASIN FEATURES – CHARACTERISTICS AND RECOGNITION**

**THE INTEGRATED BASIN – STRUCTURAL INTERPRETATION**

**PREDICTING AND EVALUATING PETROLEUM SYSTEMS AND HYDROCARBON RESOURCES IN SEDIMENTARY BASINS**
- Predictive models
- Play and prospect analysis
- Risk factors
- Source rock & hydrocarbon phase
- Migration & timing
- Reservoir & trap

**GEOCHEMICAL BEHAVIOR OF AROMATIC HYDROCARBONS**
- Effects of maturation, terrestrial input, lithology
- Depositional environments
- Maturity parameters

**INTERPRETATION BASEIN DEPTH, INTEGRATED DATA ANALYSIS AND BASIN MODELLING: A CASE STUDY**

**INTERPRETATION PHILOSOPHY AND DATA INTEGRATION SOFTWARE**

**SUMMARY AND DISCUSSION**

**Program Schedule**

(Day 1 - Day 3)

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<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Registration</td>
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<tr>
<td>09:00</td>
<td>Morning session begins</td>
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<td>10:40 - 11:00</td>
<td>Refreshments</td>
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<td>12:45</td>
<td>Luncheon</td>
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<tr>
<td>14:00</td>
<td>Afternoon session begins</td>
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<tr>
<td>15:30 - 15:50</td>
<td>Refreshments</td>
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<td>17:00</td>
<td>Course ends</td>
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**SRK Consulting**

3
3 Day Course Outline - continued

DAY 3 - 16 April 2011

OIL FAMILIES - MARINE AND LAND PLANT INDICATORS

DIFFERENTIATION BETWEEN SOURCE (LITHOFA- CIES) AND MATURATION EFFECTS

SOURCE ROCK HYDROCARBON POTENTIAL AND CONTROLLING FACTORS
• Depositional environments
• Organic components & kerogen types
• Levels of maturity
• Hydrocarbon generation: phases & timing
• Types and applications

HYDROCARBON MIGRATION AND FRACTIONATION – THE EARTH FILTER

RESERVOIR EXTRACTS AS PROXY FOR HYDROCARBON CHARGING AND SOURCE ASSESSMENT: A CASE STUDY

EXPLORATION STRATEGIES TO ENHANCE SUCCESS AND PROFITABILITY
• From virgin territory to first well
• From first discovery to mature basin
• Creaming curves
• Quantitative risk analysis

VALUING OIL AND GAS RESERVES
• Petroleum Resource Management System
• Reserves estimation
• Valuation methodologies

THE FUTURE OF GLOBAL OIL RESOURCES AND RESERVES – PEAKS AND TROUGHS
• Hubbert curves

DRAWING TOGETHER THREADS: SUMMARY AND DISCUSSION
• Future prospects for basin analysis

Reserve your place today!

Delegate Details

Name: Dr/Mr/Ms _______________________
Company: _______________________
Job Title: _______________________
Tel: _______________________
Mob no: _______________________
Email: _______________________
Main business: _______________________
Signature: _______________________

Payment Method

☐ I enclose my cheque payable to SRK Consulting
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  Commonwealth Bank
  BSB: 062-902    Acc No: 1003 5314

Course Rate
AU$2000 plus gst = AU$2200
Rate includes: 3 day workshop, luncheon, refreshments and complete set of documents

Register Now!
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Email: rdickson@srk.com.au

Course Questions?
Email: pstuartsmith@srk.com.au
Phone: 0419 287 201
Fax or email your reservation to Robyn Dickson

Payment Terms
• Payments must be received 10 days prior to the event (4 April 2011)
• All payments must be made in AU dollars
• Payments made by cheque to be made to SRK Consulting (Australasia) Pty Ltd
• Payments made by direct transfer to be made to SRK Consulting (Australasia) Pty Ltd
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Please quote the name of the delegate, event title and invoice number on the advise when remitting payment and advise SRK by email rdickson@srk.com.au or fax: 08 9288 2001 and include this registration page
• Upon receipt of payments a tax invoice will be emailed to you.

Cancellation/Substitution
• Should you be unable to attend a substitute delegate is welcome at no extra
  charge.
• Cancellations must be received in writing at least 10 days before the start of
  the event, to receive a refund less 10% processing fee per registration. The
  company regrets that no refund will be made available for cancellation
  notifications received less than 10 days before the event, unless the event is
  being canceled by SRK Consulting.
• SRK Consulting reserves the right to cancel this event should minimum
  numbers of 10 participants be received. In this case SRK Consulting will give
  a minimum 10 days’ notice prior to canceling.