

SPE WORKSHOP:

Unconventional Resources – Tools and Practices for Optimal Exploration, Appraisal and Development

20 - 21 NOVEMBER 2017
BRISBANE, AUSTRALIA



Who Should Attend

Engineers, Technical Specialists, Managers, Academicians, Researchers and Professionals in:

- Drilling
- Completions
- Field Development
- Production
- Reservoirs
- Subsurface
- Well Engineering

With the prolonged drop in oil and gas prices, and the subsequent reduction in unconventional exploration and production activities, opportunities have emerged for operators who can identify and efficiently exploit the most prolific prospects in the current lower-cost environment. While extraordinary improvements have occurred in horizontal drilling and completion technologies, many Asia Pacific unconventional plays have not kept pace with the North American successes.

An exception in the Asia Pacific region is Australian coal seam gas (CSG) plays, which have successfully transitioned from appraisal to development and are delivering LNG worldwide. However, opportunities still exist to further optimise CSG production. Although these CSG resources may seem different compared to other unconventional, expansion into new CSG areas throughout the Asia Pacific region will require technologies and strategies common to other shale and tight gas plays.

Session Highlights

Interactive sessions will cover critical and diverse topics such as:

- Strategies to identify, target and develop reservoir "Sweet-spots"
- High-grading drilling acreage and well targeting
- Establishing fit-for-purpose data requirements and workflows
- Improving the understanding of rock and fluid flow behaviour in unconventional reservoirs
- Drilling and completion strategies for challenging geomechanical scenarios
- Optimising production practices – Flow optimisation, artificial lift and fines management
- Infill development based on optimising well interference and economics
- Identifying new and emerging technologies and opportunities relevant to unconventional reservoirs

Technical Programme Committee

CHAIRPERSONS

Raymond Johnson Jr.
Professor of Well Engineering
& Production Technology
School of Chemical Engineering
The University of Queensland

Tom Blasingame
Petroleum Engineering
Texas A&M University

COMMITTEE MEMBERS

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GROUP REGISTRATIONS AVAILABLE!
Contact us at spek1@spe.org to arrange your group.

www.spe.org/go/18WA04

Workshop Objectives

This workshop aims to share current best practices in the areas of reservoir appraisal, field development, and production optimisation for unconventional reservoirs.



10+
hours of peer-to-peer
networking opportunities



20+
hours of knowledge sharing
and technical discussion



30
expert-led technical
discussion topics



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Preliminary Workshop Schedule

MONDAY, 20 NOVEMBER 2017

0745 - 0820 Arrival of Delegates and Registration

0820 - 0830 Safety Announcement by Hotel

0830 - 0930 **Session 1: Welcome and Introduction**

Co-chairpersons: Ray Johnson Jr., **The University of Queensland**;
Tom Blasingame, **Texas A&M University**

0930 - 1000 Group Photo / Coffee and Tea Break

1000 - 1200 **Session 2: Strategies to Identify, Target and Develop Reservoir "Sweet-spots"**

Session Managers: David Hume, **Core Laboratories Ltd.**, **Integrated Reservoir Solutions**; Marcel Croon, **Weatherford**; Mike Zuber, **Independent**

This session considers the so-called "sweet spots" in unconventional reservoirs, which is loosely defined as the most prolific locations to drill, complete, stimulate and produce a well. Unconventional reservoirs are inherently complex in terms of geological and geophysical settings and well production. Well performance typically varies widely across basins, fields, and even from well-to-well. For reference, one comprehensive definition of a "sweet spot" is an area where a unique combination of rock properties, pressures, fluids, geological history, and technology combine to facilitate the optimal production of hydrocarbons.

The premise of this session is that commercial success depends upon finding and developing these reservoir "sweet spots." To date, a given "sweet spot" in an unconventional reservoir has most likely been found with the drill bit. The purpose of this session is to define and assess the challenges of finding sweet spots in unconventional reservoirs, and identify and evaluate the technologies that the industry currently uses to define and exploit these areas.

1200 - 1300 Networking Luncheon

1300 - 1430 **Session 3: High-Grading Drilling Acreage and Well Targeting**

Session Managers: David Close, **Origin Energy Ltd.**;
Usman Ahmed, **Welldog**; Bill Esco, **PETRONAS**

Similar to the establishment of production "sweet spots" (discussed in Session 2), there is arguably no greater value driver for oil and gas exploration in unconventional reservoirs than the choice of the basin, play and drilling target. However, not all aspects of high-grading drilling targets deal with technical or economic goals. There are also socio-political drivers that influence these efforts (e.g. minimal-impact well pads, much longer laterals, and fit-for-purpose completions).

The dual goals of driving down costs while simultaneously improving efficiencies may seem incompatible, but these goals are the fundamental underlying success factors in unconventional plays. This session explores cases where the drivers of lowering costs and optimising efficiencies have led to strategic, basin-entry decisions and high-grading well targeting for exploration and development. This session covers a cross-section of these issues and how they have impacted exploration, appraisal, and development activities in Australia and internationally.

1430 - 1445 Coffee and Tea Break

1445 - 1615 **Session 4: Establishing Fit-for-Purpose Data Requirements and Workflows**

Session Managers: Mark Stone, **Department of Natural Resources & Mines**;
Matthew Bax, **IHS Markit**

This session addresses fit-for-purpose data requirements and workflows required to assess well performance data and to develop representative reservoir characterisation studies. Unconventional reservoirs are often viewed as "under-described" in terms of reservoir data and the need to develop appraisal and development decisions is often hindered by inadequacies of data. Put simply, the goal of this session is to provide insight into how the use of field data can help achieve appraisal and development answers quickly, with or without reservoir modelling.

While reservoir modelling (i.e. numerical simulation) has been a cornerstone in both the appraisal and development of unconventional resources, the workflows and data requirements associated with numerical simulation are very intensive. To underpin commercial decisions, numerical simulations are expected to provide and deliver proportionately more accurate and comprehensive estimates. Practically, most numerical simulation studies take several months to create, calibrate, and forecast, making it impractical nor warranted to create a numerical simulation model for every well.

This session explores guidance on the integration of results from other

POSTER SOLICITATION & INFORMATION

All participants are encouraged to prepare a poster for the Workshop. Presentations on both research and field experience are welcomed. Posters, including unconfirmed / partial results, are to be presented at an assigned time and are open for discussion. Posters will be on display for the entire Workshop period.

When preparing your poster:

- Avoid commercialism. No mention of trademarks / product name
- Poster size should be approximately 0.8m x 1.2m (W x H) or size A0 in portrait layout
- Identify topic by title, affiliation, address, and phone number
- Include a brief abstract that summarises the technology to be addressed
- Make the display as self-explanatory as possible
- Place the information in sequence: beginning with the main idea or problem, method used, results, etc. (Draw a plan keeping the size and number of illustrations in mind)
- Keep illustrations simple by using charts, graphs, drawings, and pictures to create interest and visually explain a point
- Use contrasting colours
- Use large print for narrative materials. (We suggest a minimum of 24 points or 3" high letters for the title)

*Note that the Workshop Programme Committee will review all poster abstracts / materials prior to display, and reserves the right to refuse permission to display any poster considered to be commercial in nature. If you are interested to participate, please email your proposed topic with a short abstract (between 200-300 words) to Jenny Chong, SPE Senior Event Manager at jchong@spe.org by **16 October 2017**.

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methodologies that can assist numerical simulation to ensure the compatibility of production forecasts.

Session 5: Improving the Understanding of Rock and Fluid Flow Behavior in Unconventional Reservoirs

Session Managers: Bob Aylsworth, **Apache Corporation**; Ron Dusterhoft, **Halliburton**; Dilhan Ilk, **DeGolyer and MacNaughton**

This session considers the "state-of-the-art" in understanding the mechanisms of fluid storage, fluid flow, and reservoir fluid phase behaviour in unconventional reservoirs. Specifically, this session will focus on some of the latest efforts to understand and model fluid properties and fluid flow characteristics within ultra-low permeability reservoirs. This session examines the interaction of different porosity types and flow mechanisms, and the interaction of local pore pressure and stress conditions on results.

The goal of this session is to stimulate the discussion whereby improving the understanding of these fluid behaviours and flow mechanisms will enable significant advances in targeting, drilling, completion, and production performance. On top of providing guidance on future potential well remediation techniques, this session will also explore enhanced oil and/or gas recovery.

1800 onwards Welcome Dinner

TUESDAY, 21 NOVEMBER 2017

0800 - 1000 Session 6: Drilling and Completion Strategies for Challenging Geomechanical Scenarios

Session Managers: Thomas Flottman, **Origin Energy Ltd.**; Jeremy Meyer, **Ikon Science**; Thomas Gan, **Arrow Energy Pty. Ltd.**

This session presents scenarios where the drilling/completion environment requires advanced geomechanical analysis and modelling (as opposed to routine near-wellbore geomechanical or geophysical analysis). In some cases, the reservoir response reflects geomechanical effects such as a stress-induced drop in productivity index. In addition, progressive depletion during production can change geomechanical boundary conditions. Given such geomechanical complexities, how do we plan future (infill) drilling and completions?

This session focuses on presentations and discussions about the progressive evolution of drilling and completion strategies during the lifecycle of exploration, development and production in challenging geomechanical conditions. One aggressive potential area for improvement could be early-time choke management, where this behaviour has shown benefit in production and recovery. Additional cases or observations will be explored along with theoretical/practical studies of geomechanical effects in unconventional reservoirs.

1000 - 1015 Coffee and Tea Break

1015 - 1145 Session 7: Optimising Production Practices - Flow Optimisation, Artificial Lift, and Fines Management - CSG

Session Managers: James Walker, **WellDog**; Andrew White, **Santos GLNG**; Dean Sullivan, **Weatherford**

This session focuses on the production practices related to optimising production practices in coal-seam gas (CSG) developments. In the Australian energy industry, the inventory of CSG wells continues to expand (and will for many decades) and the need for optimisation of production performance is now imperative. Such a challenge is further amplified by the relatively high operating costs in CSG operations (in Australia and elsewhere) and the rise in workover frequency. Specific to CSG challenges, this session focuses on all major factors of influence from the completion design, well stimulation practices, and artificial lift selection, to snubbing and work-over best practices.

1145 - 1245 Networking Luncheon

1245 - 1415 Session 8: Optimising Production Practices - Flow Optimisation, Artificial Lift, and Fines Management - Tight Gas

Session Managers: James Walker, **WellDog**; Simon Chipperfield, **Santos GLNG**; Dean Sullivan, **Weatherford**

The focus of this session is global tight gas (i.e. permeabilities ranging from 0.001 to 1 md). The purpose of this session is to provide guidance on the best practices related to the optimisation of well performance, including well targeting and placement, well stimulation, production practices and optimisation (including artificial lift), and the evaluation of well performance in tight gas reservoirs.

As this session considers global impact, examples from around the world will be presented and discussed. Currently, tight gas is of lesser priority in North America, but many regions of the world have yet to develop virtually any of their tight gas (e.g. North Africa, certain countries in the Middle East, Southeast Asia, etc.). This session highlights the need to prioritise tight gas development as a generally less expensive and more prolific alternative to shale/resource systems and explore key aspects leading to successful tight gas developments.

1415 - 1430 Coffee and Tea Break

1430 - 1600 Session 9: Infill Development based on Optimising Well Interference and Economics

Session Managers: Ron Dusterhoft, **Halliburton**; Dilhan Ilk, **DeGolyer and MacNaughton**; Andrew White, **Santos GLNG**

This session considers the most practical of all aspects of unconventional reservoir development — parent-child performance degradation and well-to-well fracture interference (more commonly known as "frac-hits"). Infill well sequencing in unconventional reservoirs has proven to be more challenging than expected for a variety of reasons, including depletion of local pore pressure, localised effects on geomechanics, parent-child performance degradation, and offset well stimulation interference (or frac hits).

From these negative effects, production performance of infill wells has often been disappointing and affects well performance and field economics. In every unconventional play, numerous efforts have been attempted to mitigate these problems but local conditions require specialised solutions which are likely not transferrable from play-to-play. For this session, cases will be explored to provide context for successful and less successful cases and what correlating factors or conditions can lead to success.

1600 - 1730 Session 10: Identifying New and Emerging Technologies and Opportunities Relevant to Unconventional Reservoirs

Session Managers: David Hume, **Core Laboratories Ltd.**, **Integrated Reservoir Solutions**; Usman Ahmed, **WellDog**; Simon Chipperfield, **Santos GLNG**

This session focuses on new and emerging technologies as well as the associated opportunities relevant to unconventional reservoirs. As an example, a little more than a decade ago, horizontal wells with multi-stage hydraulic fracture treatments were new and emerging technologies with uncertainty around viability or practicality. With the benefit of hindsight, no one would argue that these two phenomena have revolutionised unconventional reservoir development, but what is next?

Optimisation of the Multi-Fractured Horizontal Well (MFHW) is inevitable, and some would argue that we may have reached technical limits at the present, but we know optimisation of MFHWs will continue. This session will explore new technologies to push the boundaries such as advances in:

- Data mining and data analytics;
- Fracturing fluids (e.g. minimal or water-free fracturing fluids);
- Smart fluids and proppants to verify created and propped fracture volumes
- Improved/enhanced oil recovery (e.g. waterflooding, gas flooding, surfactants);
- Artificial lift technologies for horizontal wells; and
- Fibre-optic diagnostics (strain, pressure, and chemical).

1730 - 1745

Session 11: Workshop Concludes

Co-Chairpersons: Ray Johnson Jr., **The University of Queensland**; Tom Blasingame, **Texas A&M University**

SPONSORSHIP SUPPORT INFORMATION

Sponsorship support of the event helps offset the cost of producing workshops and allows SPE to keep the attendance price within reach of operation-level individuals, those who benefit most from these technical workshops.

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FOR MORE INFORMATION

For a detailed list of available sponsorship opportunities, including benefits and pricing, contact **Jenny Chong, SPE Senior Event Manager** at jchong@spe.org.

GENERAL INFORMATION

DOCUMENTATION

- Proceedings will not be published; therefore, formal papers and handouts are not expected from speakers.
- Work-in-progress, new ideas, and interesting projects are sought.
- Note-taking by attendees is encouraged. However, to ensure free and open discussions, no formal records will be kept.

WORKSHOP DELIVERABLES

- The committee will prepare a full report containing highlights of the Workshop and the report will be circulated to all attendees.
- Powerpoint presentations will be posted online and provided to attendees after the Workshop. Provision of the materials by Discussion Leaders will signify their permission for SPE to do so.

COMMERCIALISM

In keeping with the Workshop objectives and the SPE mission, excessive commercialism in posters or presentations is not permitted. Company logos must be limited to the title slide and used only to indicate the affiliation of the presenter.

ATTENDANCE CERTIFICATE

All attendees will receive a Workshop attendance certificate. This certificate will be provided in exchange for a complete Attendee Survey Form.

CONTINUING EDUCATION UNITS

This Workshop qualifies for SPE Continuing Education Units (CEU) at the rate of 0.1 CEU per hour of the Workshop.

TRAVEL/VISA

Attendees are advised to book their airline tickets early. All travellers must be in possession of passports valid for at least six (6) months with proof of onward passage. Contact your local travel agent for information on visa requirements.

DRESS CODE

Business casual clothing is recommended. The Workshop atmosphere is informal.

REGISTRATION FEE

- Registration fee ONLY includes all workshop sessions, coffee breaks and luncheons for the registrant.
- Accommodation is NOT included. SPE will provide details of recommended hotels upon receipt of your registration.

REGISTRATION POLICY

- Registration fee MUST be paid in advance for attending the Workshop.
- Full fixed fee is charged regardless of the length of time the registrant attends the Workshop, and cannot be prorated or reduced for anyone.

