# Deepwater and Harsh Environments

11–16 May 2008 ● Phuket, Thailand

## SPE Forum Description

Technical Discipline: Developments and Operations

Demand for energy is driving oil and gas exploration into increasingly challenging environments, including deepwater and ultradeepwater provinces where huge reserves exist. Deepwater production presents a new set of challenges, from selection of production methods, through drilling and completing the well, to intervention and workover philosophy and strategy. This picture is further complicated by the escalating cost and scarcity of suitable rigs.

The principle driver behind deepwater development is how to exploit these huge reserves in a cost-effective manner while maximising hydrocarbon recovery. A variety of system architectures need to be included. Choices such as dry tree; wet tree; tieback to production facilities; and floating production, storage, and offloading vessels (FPSOs) need to be considered. This forum will address the subsurface and production aspects of deepwater and harsh environment frontier developments by reviewing current technology, identifying the technology gaps that remain, and examining potential “game changing” strategies.

Topics to be covered include

- Subsea architecture of the future: getting more for less
- Well construction: horizontals and multilaterals
- Formation evaluation
- Sand control: open hole gravel pack, standalone screens, and expandable screens
- Completion design in deep water: are we getting smarter?
- Advanced materials of the future
- Reservoir monitoring: permanent vs. retrievable
- Future intervention techniques that drive costs down

### To Whom Forum Would Appeal

This forum will be of particular value to managers and engineers in reservoir, production, drilling, and completion engineering as well as key service suppliers with experience in deepwater development.

### Attendees Will

- Discuss common interests informally with colleagues from around the world.
- Share knowledge and experience in an off-the-record format.
- Gain new insight and perspective through conversations with others from international companies, service companies, contracting companies, research institutes, and universities.
- Enjoy a relaxed atmosphere of learning through one-on-one interaction.

Please come prepared to be a participant, not a spectator.

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## Forum Session Topics and Descriptions

| Session Title | Chairpersons |
|---|---|
| Deepwater Innovation and TRIZ: Russian Algorithmic Inventive Methodology | Don Wells |
| Nanotechnology | Curtis Wendler |
| Barriers To Adoption of New Technology | John Allen |
| Improving the Business of People and Processes | Jennifer Reese |
| Remote Operations | Jim Chitwood |
| Drilling and Completions in the Future | Tom Lane |
| Manufacturing and Delivery for Deep Water | Donna Birbiglia |

### Deepwater Innovation and TRIZ: Russian Algorithmic Inventive Methodology

Delivering the new, the challenging, the “untested” and “untried” requires innovation, originality, improvement, creativity, imagination, and the unique ability to embrace risk. Getting it right requires some luck, and more importantly, a systematic approach to risk management. The Russian theory of inventive problem solving, also known as TRIZ, has been available since 1946. It is a system that compares risks to every major patent and finds a single common denominator that spells “success”.

As a follow-up to our keynote presentation on TRIZ, this session will focus on applied inventive methodologies and the practicalities for their use in deepwater and harsh environment oil and gas developments. We will explore typical industry techniques and also examine TRIZ and other evolutionary techniques for meeting the challenges ahead.

### Nanotechnology

Nanotechnology has been successfully used in other engineering fields such as aerospace and pharmaceuticals.. Applications of similar technologies to the oil and gas industry may solve some its more challenging developments in an economical and safe manner.

Starting with the produced fluids, nanotechnology has been applied to chemical inhibitors that are injected into the production stream and can be applied to "smart pills" that might be delivered to the sand face in the reservoir, releasing necessary chemicals over time. Nanotechnology has already been employed for high-performance insulation systems, making "pipe-in-pipe" systems easier to install and delivering higher levels of thermal performance.

Nanotechnology also has the potential to improve topside and subsea surveillance in deepwater and harsh environments. Fiber optics, combined with piezoelectric sensors and other technologies, can lead to unmanned installations in remote or harsh environments. Following surveillance comes repair, where more recently materials with self-healing properties have emerged. As always, the rewards of new technology must be weighed against the cost of product development and the risk of the unknown. Who legislates the use of nanotechnology, and what safeguards do we need? It is very likely that without the use of these new technologies, many of the future deepwater and marginal fields may remain undeveloped. This session will focus on nanotechnology and its role in expanding the operating regions for deepwater and harsh environments.

### Barriers To Adoption of New Technology

Advances in technology have been instrumental in enhancing safety, improvements in environmental impact, lowering costs, and enabling access to new reserves. But are we making full use of available technologies?

In today's market here are countless examples of "new and improved" tools/services that have passed all required testing and certification, but have yet to be adopted by industry. This is known in Research and Development circles as the Technology *Valley of Death*. Ironically, many of the edgy 90's technologies such as 3D seismic, horizontal drilling, and subsea processing have gain broad utilisation across the industry. What makes one technology so desirable while others are destined?

Key questions include

- What differentiates successful new technologies from failure or commercial failures?
- What is the "normal" timeline from concept to first commercial application, and how can it be accelerated?
- Is there a clear and understood metric for risk (and benefit)?
- Has supersizing and merger mania eliminated the "can do" spirit of the small enterprise?
- How do you protect and market *game changing* technology?

Other factors that influence the use of new technology include health, safety, and the environment; regulatory and local customs; risk vs. reward; the dominance of capital expenditures (capex) vs. operating expenditures (opex); life-cycle cost (the net-present-value or NPV model); historical lessons learned; and experiences and buy-in from the user asset (risk averse vs. inventive gains).

This session will discuss barriers to adoption of new technology and what can be done to eliminate these barriers.

## Improving the Business of People and Processes

To thrive and succeed in the deepwater environment requires two essential elements: the best and brightest people, and innovative technology. As an industry, how do we attract, train, and retain new, talented engineers while not closing doors to our experienced "elders"? How do we set up an organisation that allows for the best and brightest to contribute to their maximum potential? What about knowledge management? How do we gain access to real learning and shared lessons while maintaining legal or contractual obligations? How do we maintain a distinctive, competitive advantage?

This session will focus on areas such as

- Shared lessons: formal or informal; "our way" vs. "the right way"
- Partnering, alliances, and the role of the regulator
- Identifying innovative training techniques for engineers of the future—whether new to our industry or new to deep water
- Attracting the right demographics when competing with well-known innovative and financially rewarding industries like dotcoms, aerospace, and finance
- Standardisation and innovation: can they coexist within a project?
- Organisational structure that promotes success: how much empowerment vs. upward accountability?

## Remote Operations

This session will focus on remote subsea well operations. To maximise regional development around existing surface host facilities, subsea tiebacks are sometimes used to produce small reservoirs that are not capable of supporting their own in-field surface host. We need enhanced recovery techniques such as pressure boosting, which significantly extends the "practical" offset of such tieback wells, to recover the greatest amount of crude from these wells. The status of pressure-boosting-technology and the need for further development will be discussed.

Another aspect of maximising recoverables is economical (low-cost) well-intervention methods. The conservatism in our deepwater designs may be limiting our ability to deliver the next generation of long tiebacks for fear of hydrate and wax plugging. A design philosophy with simple, uninsulated flowlines and periodic interventions with a dedicated, low-cost intervention system will be examined. Low-cost intervention could also play a role in closing the "recoverable reserves" gap between subsea and dry-tree developments.

Once the near-term technology issues are framed, extension of these technologies to future field needs will be discussed. This discussion includes such challenges as extreme pressures, difficult production fluids (sour or high viscosity), and limited-access areas such as the Arctic (below-freezing environment) and reservoirs under ice.

### Drilling and Completions in the Future

The session will challenge the current limitations in drilling and completions operations and technologies that drive the industry towards costly solutions. Specifically, this session will address technical and operational aspects of drilling, completing, and doing “workovers” on wells in deepwater and other harsh environments. We will discuss the technical issues where current tools, equipment, and processes are not adequate.

Speakers will suggest ideas on how to develop improved tools and procedures for greater reliability and more effective drilling and completion operations. We will review technologies on formation evaluation; formation testing and sand control, such as horizontal gravel packs; and standalone screens and expandable tools. We will compare horizontal and multilateral well design and forecast future drilling operations in ice-pack areas.  We will also explore going beyond today’s sixth-generation drilling rigs towards the rig of the future needed to support such operations

### Manufacturing and Delivery for Deep Water

The maturation of the deepwater basins around the world is fuelling an increase in the number of deepwater projects being developed. Manufacturers are reaping the benefits of deepwater developments, with contracts totalling more than a billion dollars being awarded. But at what price? Is there room for new R&D when such huge projects demand so much design and fabrication resources? Will standardisation be ultimately defined by market population? With deepwater and harsh environments, the industry must realise the added burden of improved design processes and quality management techniques. Systematic material failures can easily result in doubling the cost of a deepwater development. This session will discuss how these challenges are being met, with particular emphasis on

- Resource constraints in both contractor and energy companies
- Contracting and how local regulatory bodies affect the success of the project
- The impact that limited infrastructure can have on costs and staffing levels
- Measuring project success and how the various stakeholders can limit project delivery and team organisation
- Maintaining focus on quality assurance and quality control throughout manufacturing and installation

## Steering Committee

**Co-Chairpersons**

**Mark Siegmund**, BP

**Jon Sonka**, ExxonMobil Development Company

**John Allen**
ABB Offshore Systems ASS

**Mario Ardilla**
Schlumberger

**Donna Birbiglia**
Sarawak Shell Bhd

**Mauricio Werneck de Figueriredo**
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**Chris Flannery**
Murphy Oil Corporation

**Tommy Golczynki**
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**Michael Verm**
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## Application Information

Participants at SPE Forums are selected by the SPE Forum Series Steering Committee on the basis of ability to contribute to the discussion of the topic. Attendance is limited to maximise each person's opportunity to contribute.

To apply, complete and return the application form in the brochure by **7 March 2008**. Include enough information about your experience and knowledge to enable the SPE Forum Series Steering Committee to evaluate your potential contribution to the forum. Upon acceptance, you will receive registration materials in late February 2007, including detailed information on housing, transportation, and fees. After notification of acceptance, your registration form with payment must be returned to SPE by **8 April 2008** to ensure your place in the forum. All accepted participants must register and pay the full fixed fee in advance.

### Forum Registration Fee

**USD 2,250 per person on/before 8 April 2008**
**USD 2,350 per person after 8 April 2008**

Includes the following for the forum participant:

- Registration to attend all the forum sessions
- Five nights' hotel accommodation based on single occupancy
- Welcome reception and dinner with entertainment on Sunday
- Breakfast and lunch Monday through Friday
- Dinner on Monday, Tuesday, and Thursday
- Daily coffee breaks
- Round trip airport transfer by shuttle bus

Please note: **Attendees are expected to attend the full forum.** The full fixed registration fee is charged regardless of the length of time a registrant attends the forum. The base registration fee does not include accompanying persons. Details of accommodation and rates for spouses and family members will be sent with the registration packet that will be mailed to each delegate upon acceptance.

### The Forum Series Format

The SPE Forum Series provides morning, afternoon, and evening sessions of short, scheduled and unscheduled presentations, with maximum time available for informal discussions and exchange of experience.

To encourage the free interchange of information and ideas, SPE Forums are conducted off the record. Written papers are prohibited, and extensive note taking is not allowed. Mechanical recording of any portion of the forum in any form (photographic, electronic, etc.) is prohibited. Information disclosed at a forum may not be used publicly without the originator's permission. Participants are specifically requested to omit reference to forum proceedings in any subsequent published work or oral presentation.

A short written summary of major issues and consensus arising form the forum may be prepared and distributed to attendees after the forum at the discretion of the steering committee, and with appropriate SPE approval.

To encourage maximum discussion, lengthy, formal presentations are discouraged. Presentations are usually limited to three or four slides or transparencies. Breakout sessions for discussions in smaller groups are common. Participants are encouraged to come prepared to contribute their experience and knowledge, NOT to be spectators or students.

To create a cohesive group in which discussion is free flowing, attendance at forums is limited, and only registrants are allowed to attend sessions. To ensure opportunities for formal and informal discussions, all attendees are expected to attend every forum session.

**Forum sessions and housing will be at the Laguna Beach Resort, Phuket, Thailand.**

**APPLICATION DEADLINE: 7 March 2008**

# Deepwater and Harsh Environment

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**This application is due by**
**7 March 2008**
**Do NOT send payment with this form.**

Please print or type

Name (First) (Middle) (Last)

SPE Member Number ☐ Check here if you are not an SPE member

Job Title and Discipline

Company Name

Complete Mailing Address

Telephone Number Fax Number

Email Address

**IMPORTANT: List experience** that qualifies you to attend this forum, and specify your expectations of this forum. Use additional paper if required.

Please identify your primary discipline from the six categories below.

- ☐ Drilling and Completions
- ☐ Production and Operations
- ☐ Management and Information Technology
- ☐ Health, Safety, Security, Environment, and Social Responsibility
- ☐ Projects, Facilities, and Construction
- ☐ Reservoir Description and Dynamics

Do you wish to make a presentation about evolving and future technologies, issues, or challenges? Presentations are 5–10 minutes long, with only three or four slides. No professionally prepared visual aid may be used. Attach additional paper if required.

Do you wish to present a poster? If so, please specify topic and provide brief description.

The poster chairperson will notify you by telephone or email if your poster is accepted.

**Note:** Recording of any portion of the SPE Forum Series in any form (photographic, electronic, etc.) is strictly prohibited. Extensive note taking is forbidden; printed reference to any SPE Forum discussion is not permitted without the consent of the parties involved. All participants are specifically requested to omit public reference to forum proceedings in any published work or oral presentation. Registrants agree to attend ALL forum sessions, and discuss and share with forum participants their experiences and knowledge in the subject area, specifically in those areas of advanced technology in a given subject.

Each participant agrees to the above regulations when application is submitted.

**Signature** **Date**

Submit this completed application by mail, fax, online, or email. Do not send payment with this form.

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**Website**: www.spe.org

Applications are reviewed by the SPE Forum Steering Committee. Accepted applicants will receive their registration form and other materials in March 2008 AFTER acceptance by the committee. Accepted applicants must return their registration form with payment by **8 April 2007.**