Geohazards considerations have grown in importance in upstream oil and gas, as the industry becomes increasingly aware of the potentially devastating impact they can have on the cost, schedule and complexity of every phase of field development. It is therefore critical that technologies and practices are continuously developed to ensure geohazards risks are timely and accurately identified, and effective measures are deployed to mitigate the risks involved.

Geohazards include submarine slides, shallow gas and dissociation of gas hydrates, mud volcanism, steep seafloor slopes, seismic activities, history of mass transport activity, seafloor dissolution and collapsible ground. The benefits and value of geohazard planning, impact on facilities, subsidence, mapping, drilling, natural waterflow. With activity in shallow water, shallow gas and unconsolidated sediments are major challenges. With more activity in deeper water, both pipeline stability as well as formation stability changes in the form of turbidite currents and quick sedimentation processes that may lead to overpressured formations and dissociation of hydrates will need to be part of the risk mitigation. Additionally, changes in the mechanical state of rocks can seriously affect drilling operations, completion infrastructures, and production performances which can result in unexpected cost and time overruns.

This workshop will present an advanced overview of surface facilities and subsurface-related geohazards. Particular attention will be paid to the improvements in geohazards identification, quantification of risk and mitigation, best practices, lessons learnt and technological advancements in handling geohazards, and potential impact on existing offshore structure stability in the current challenging environment. Special discussions will focus on geohazards-related wellbore stability and pore pressure predictions which serve as important components in well design and operations, and how geohazards can be taken into consideration to develop a simulation strategy to enhance production.

The benefits and value of geohazard planning, impact on facilities, subsidence, mapping, drilling, natural ground instability and movement such as creeping landslides, ground dissolution and collapsible ground will be discussed. In addition, the workshop will review and identify current and future technologies of both shallow and deepwater geohazards.

### Session Highlights

- Geohazards – Is it only a well problem? To what degree does this affect the facilities?
- Identification and risk mitigation of geohazards
- Geomechanics management – Drilling and completions
- Innovation, best practices and lessons learnt – Identifying, handling and avoiding geohazards
- Geohazard characterisation and impact on field development plans
- Simulation and prediction of small-scale to worst-case scenarios of geohazard impacts
- Deepwater challenges – Pipeline routing and stability, turbidite currents and rapid sediment deposits
- Shallow water challenges – Shallow gas, shallow faulting, shallow water flow, hydrate dissociation, unconsolidated sediments and soft seabed
- Offshore geohazards and seabed mobility
- Formation compaction leading to slumping – Geohazards as part of reservoir management
- Planning of immediate and long-term effects – Discussion on facility planning and proposed pipeline planning within the project lifetime

### Who Should Attend

- Drilling Engineers
- Facility Engineers
- Geomatics Engineers
- Reservoir Engineers
- Well Engineers
- Geologists
- Geomodellers
- Geophysicists
- Petrophysicists
- Asset Managers
- Exploration and Development Managers
- Subsurface Managers
- Oil and Gas Field Development
- G&G Professionals
- Quantitative Interpreters

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www.spe.org/go/18WM02
**Workshop Objectives**

- Gain state-of-the-art overview of surface facilities and subsurface-related geohazards
- Review advances in geomechanical analyses
- Enhance knowledge base on oil and gas development related geohazards
- Advance understanding on hazard identification and mitigation strategies
- Examine latest techniques on operating offshore surface structures related geohazards
- Provide unique opportunities to interact with surface and subsurface professionals

### Preliminary Workshop Schedule

**MONDAY, 25 SEPTEMBER 2017**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session/Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0900 - 0930 hrs</td>
<td>Welcome and Introductions</td>
</tr>
<tr>
<td>0930 - 1000 hrs</td>
<td>Keynote Address</td>
</tr>
<tr>
<td>1000 - 1030 hrs</td>
<td>Session 1 – Identification and Risk Mitigation of Geohazards</td>
</tr>
<tr>
<td>1030 - 1230 hrs</td>
<td>Session Managers: Sanjeev Raipur, Gaffney, Cline &amp; Associates; Sachin Kumar Sharma, Schlumberger</td>
</tr>
<tr>
<td>1230 - 1330 hrs</td>
<td>Session 2 – Shallow Water Geohazards</td>
</tr>
<tr>
<td>1330 - 1500 hrs</td>
<td>Session Managers: Norhasilza Kasim, PETRONAS; Richard Spiteri, Sarawak Shell Berhad</td>
</tr>
</tbody>
</table>

**SESSION 3 – DEEPWATER HAZARDS**

- Predefined decision trees and contingency plans in the Reservoir Management Programme (RMP).
- From an operational standpoint, the latest technology applications for geohazards management in the oil and gas industry will be presented.
- A discussion on the latest trends for early stage and ongoing deepwater operations.
- Understanding deepwater geohazards and the identification, quantification of risk and choosing techniques to avoid, minimise or mitigate these hazards.
- This session will address current approaches, best practices, lessons learnt and advanced technologies to mitigate the risk of deepwater geohazards and to highlight their impact on deepwater environment activities.

**SESSION 4 – WELLS PLANNING, RISK, IDENTIFICATION OF HAZARDS, CONSTRUCTION AND POST DRILLING REVIEW**

- An overview of the latest technologies and best practices in the field of geohazards.
- The session will focus on the impact of geohazards to development plans and how to mitigate these hazards.
- The latest technology applications for geohazards management in the oil and gas industry will be presented.
- Lessons learnt will be shared and current approaches, best practices and advanced technologies will be discussed.

**SESSION 5 – INNOVATION, BEST PRACTICES AND LESSONS LEARNT**

- A discussion on the latest trends for early stage and ongoing deepwater operations.
- A discussion on the latest trends for early stage and ongoing deepwater operations.
- An overview of the latest technologies and best practices in the field of geohazards.
- Lessons learnt will be shared and current approaches, best practices and advanced technologies will be discussed.

**SESSION 6 – GEOMECHANICAL ANALYSES**

- Geomechanical analyses aim to reduce expensive drilling and operations. In recent years, there are a number of big discoveries in deepwater and ultra-deepwater. The increase in exploration/appraisal drilling and development plans will require further improvements in the quality of planning and execution of projects, estimating value of information and value at risk, scenario building, hypothesis testing during the project gestation stage to maximise overall project value.

**SESSION 7 – CONSTRUCTION AND POST DRILLING REVIEW**

- Construction and Post Drilling Review will also showcase successful solutions that have been previously adopted. These include leveraging on new technologies such as the Autonomous Underwater Vehicles (AUV) and by doing a comprehensive geohazards analysis from the well surface location right down to the target.

**SESSION 8 – NETWORKING LUNCH**

- Networking Lunch will highlight common and not-so-common issues that are often faced during drilling operations as well as engineering activities. Operational issues such as operating a jack-up rig within massive coral outcrops, identifying potential spudding issues like punch-through/rapid penetration, and managing gas issues within a mature field will be discussed. The session will also showcase successful solutions that have been previously adopted. These include leveraging on new technologies such as the Autonomous Underwater Vehicles (AUV) and by doing a comprehensive geohazards analysis from the well surface location right down to the target.
Well planning based on defined well objectives is an essential aspect of the well construction process. Aligning well objectives is necessary to manage drilling hazards and the associated mechanical risks critical to successful well execution. All drilling operations carry risks, therefore mitigating these is fundamental to the management of Non Productive Time (NPT). Lessons learnt are an important part of the business. Using lessons learnt to document all accidents, incidents and other risk-related situations, one can manage and improve the continued well construction cycle, better manage NPT and reduce the overall well cost per barrel.

**MONDAY, 25 SEPTEMBER 2017**

- **1030 – 1100 hrs** Coffee Break
- **1100 – 1230 hrs** Networking Lunch

**SESSION 5 – GEOHAZARD IMPACT ON FACILITIES**

**Session Managers:** Jamaluddin Takei, PETRONAS; Nursaaidah Hassim, PETRONAS

This session will focus on the impact of geohazards to facilities such as platforms, wells and pipelines during operations and abandonment. The magnitude of the impact will differ depending on whether the facilities have been designed to cater for various hazards. The additional scope for geohazard management is certain to affect the project cost, and having the right technical judgments can potentially assist to avoid overdesigning these facilities. This session will share experiences from past and current projects dealing with geohazards impact; with an emphasis on changes to the standards and procedures and risk assessment mitigation plans.

**TUESDAY, 26 SEPTEMBER 2017**

- **0900 – 1030 hrs** Session 5 – Geohazard Impact on Facilities
- **1030 – 1100 hrs** Coffee Break
- **1100 – 1230 hrs** Session 6 – Geomechanics to Mitigate Geohazards Throughout the Field Life Cycle

**Session Managers:** Amitava Ghosh, Baker Hughes; Tobias M Müller, CSIRO Energy

Geomechanics plays an important role throughout the lifecycle of any field. Understanding the stresses, rock deformations and failures is critical for decision-making in all stages from exploration, appraisal and development, production until abandonment. Geomechanical analyses aim to reduce expensive drilling hazards and increase reservoir performance without compromising on safety. This session will discuss strategies for hazard mitigation through different geomechanical analyses through the field life-cycle e.g. well planning, pore pressure prediction, wellbore stability, sand production, cap rock integrity, etc.

**SESSION 6 – GEOFACIAL IMPACT ON FACILITIES**

**Session Managers:** Amarpreet Dhaliwal, Baker Hughes; M Müller, CSIRO Energy

Geomechanics plays an important role throughout the lifecycle of any field. Understanding the stresses, rock deformations and failures is critical for decision-making in all stages from exploration, appraisal and development, production until abandonment. Geomechanical analyses aim to reduce expensive drilling hazards and increase reservoir performance without compromising on safety. This session will discuss strategies for hazard mitigation through different geomechanical analyses through the field life-cycle e.g. well planning, pore pressure prediction, wellbore stability, sand production, cap rock integrity, etc.

**SESSION 7 – GEOMECANICS TO MITIGATE GEOFACIAL HAZARDS**

**Session Managers:** Amarpreet Dhaliwal, Baker Hughes; M Müller, CSIRO Energy

Geomechanics plays an important role throughout the lifecycle of any field. Understanding the stresses, rock deformations and failures is critical for decision-making in all stages from exploration, appraisal and development, production until abandonment. Geomechanical analyses aim to reduce expensive drilling hazards and increase reservoir performance without compromising on safety. This session will discuss strategies for hazard mitigation through different geomechanical analyses through the field life-cycle e.g. well planning, pore pressure prediction, wellbore stability, sand production, cap rock integrity, etc.

**SESSION 8 – INNOVATION, BEST PRACTICES AND LESSONS LEARNT**

**Session Managers:** Ravi Kanti Pathak, PETRONAS; Maike Willuweit, Roxar Software Solutions

This session aims to discuss current and emerging technologies and best practices in the field of geohazards management in the oil and gas industry; both subsurface and surface. The session will focus on the latest technology applications for geohazards identification which prevent costly well losses, inefficient rig time utilisation and mitigate risks during rig and vessel positioning, platform and vessel construction, pipe line routing and inspection, etc. The equally important complementary aspect of geohazards management is subsidence monitoring during field life. The session will cover developments in subsidence monitoring technologies ranging from surface to satellite measurements such as SAR interferometry (InSAR) that provides real time information for timely intervention for effective subsidence management. In these times of cost control, the session focus is furthermore aimed at discussing the added value of the overall geohazard handling. The deliberations in the session will emphasise lessons learnt and how we can efficiently incorporate these into current best practices to achieve better results.

**Workshop Summary**

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 Lesley Chua at lchua@spe.org by 15 August 2017.

The Society of Petroleum Engineers (SPE) is a not-for-profit organisation. Income from this event will be invested back into SPE to support many other Society programmes. When you attend an SPE event, you help provide even more opportunities for industry professionals to enhance their technical and professional competence. Scholarships, certification, the Distinguished Lecturer programmes, and SPE’s energy education programmes Energy4me are just a few examples of programmes that are supported by SPE.
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 completed 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.

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.

Supporters benefit both directly and indirectly by having their names associated with a specific workshop. While SPE prohibits any type of commercialism within the workshop room itself, the Society recognises that supporting companies offer valuable information to attendees outside the technical sessions.

Sponsorship Categories
Sponsorship categories are offered on a first-come basis. Please contact SPE to enquire and verify the availability of categories. Existing supporters have the opportunity to renew the same level of support for annual workshops.

Sponsorship Benefits
In addition to onsite recognition, SPE will recognise sponsors on the SPE website and in all printed materials for the workshop. Based on the category selected, supporting companies also receive logo visibility on promotional workshop items.

For More Information
For a detailed list of available sponsorship opportunities, including benefits and pricing, contact Lesley Chua at lchua@spe.org.
SPE Member: ☐ Yes ☐ No Membership No. ____________________
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(First / Forename)   (Middle)   (Last / Family Name)

Position: __________________________________________________________________________________________________________________

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Would you be willing to give a brief (10-15 minutes) presentation _______(Yes/No)? If yes, please attach the topic with a short abstract of your proposed
presentation. One of the Programme Committee members will contact you to discuss your presentation.

Important: Registrants for SPE Workshops are accepted on the basis of information submitted by each registrant.

Technical Disciplines (Check One)
☐ Drilling ☐ Health, Safety, Security, Environment and Social Responsibility
☐ Completions ☐ Production and Operations
☐ Management and Information ☐ Reservoir Description and Dynamics
☐ Projects, Facilities and Construction

Primary Responsibility (Check One)
☐ Drilling ☐ Economics ☐ Geology ☐ Geophysics ☐ Management
☐ Operation ☐ Production ☐ Reservoir ☐ Surveillance ☐ Other: ____________________

List background and experience. (Use additional paper if required).

List your expectation for the Workshop, so that the committee can tailor a portion of the Workshop to answering attendees’ concerns. (Use additional
paper if required).

Registration Fees

Please tick appropriate box

Super Early Bird Registration BY 31 July 2017 Early Bird Registration BY 31 August 2017 Registration AFTER 31 August 2017

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Workshop (25 - 26 September 2017) ☐ US$ 900.00 ☐ US$ 1,100.00 ☐ US$ 1,000.00 ☐ US$ 1,200.00 ☐ US$ 1,100.00 ☐ US$ 1,300.00

GROUP REGISTRATIONS AVAILABLE – Please contact us at spekl@spe.org.

Note: Fee includes workshop sessions, workbook, certificate, networking reception, group dinner, networking lunches and coffee breaks. Registration fees
does not include accommodation.

Payment by Telegraphic Transfer
☐ Telegraphic Transfer (Bank details will be provided on the tax invoice).

Payment by Credit Card

Credit Card Payment will be in U.S. Dollars only
☐ American Express ☐ MasterCard ☐ Visa ☐ Diners Club

Card Number / Expiration Date (mm/yy)

Security Code (3 digits on back of card/4 digits on the front of Amex)

Name of Card Holder

Signature

Note: Forms will not be processed and space cannot be guaranteed unless accompanied by payment for total amount due.

Cancellation Policy:
a) A processing fee of USD150.00 will be charged for cancellation received thirty (30) days prior to the first day of the workshop.
b) 25 % refund will be made for cancellation received between twenty nine (29) - fifteen (15) days prior to the first day of the workshop.
c) No refund on cancellation received fourteen (14) days prior to the first day of the workshop.
d) No refund will be issued if a registrant fails to show up on-site.

This form may be used as a company invoice.

Mail completed registration form with remittance and any supporting material to:

Society of Petroleum Engineers
Suite 12.01, Level 12, Menara IGB, Mid Valley City
Lingkaran Syed Putra, 59200 Kuala Lumpur, Malaysia.
Tel : 60.3.2182.3000     Fax : 60.3.2182.3030
E-mail: spekl@spe.org

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SPE Member
☐ US$ 1,000.00 ☐ US$ 1,200.00 ☐ US$ 1,300.00 Workshop (25 - 26 September 2017)