Well Control in the Gulf: Existing and Future Challenges

29-30 November 2010
Gulf Bahrain Hotel
Manama, Kingdom of Bahrain

Event Sponsors

- Noble
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## Monday, 29 November 2010

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| 07:00-08:30   | CONFERENCE REGISTRATION, COFFEE SERVICE & OPEN EXHIBITION  
Sponsored by: COR International                                                                  |
| 08:30-09:00   | WELCOMING REMARKS AND OPENING CEREMONY  
Steve Kropla, Group Vice President - Operations & Accreditation, IADC  
H.E. Dr. Abdul-Hussain Bin Ali Mirza, Bahrain Petroleum Company, Minister of Oil & Gas Bahrain   |
| 09:00-10:00   | WELL CONTROL POLICIES AND PROCEDURES  
Moderator: AbdulHadi Al-Qahtani, Superintendent Oil Drilling, Saudi Aramco |

### Evolution of Saudi Aramco’s Well Control Policies, Procedures and Equipment
Steve Smith, P.E. Specialist; Iqbal Ahmed, Adib Al-Mumen, Monty Gilleland, Saudi Aramco

Saudi Aramco’s current Well Control and Blow Out Prevention Committee, policies, procedures and equipment requirements will be highlighted, along with a description of recent changes and identified limitations with state of the industry well control equipment.

### Lekhwair Field Well Control Risk Assessment for Workover Activities
Ibrahim Al-Fori, Well Services Operation Engineer; Arie De Ward, Petroleum Development Oman

Shell’s well control manual normally requires that all well operations will be executed with protection of two independent barriers between the reservoir and the environment. However, in some cases one barrier may be allowed. Most of the Shuaiba wells in Lekhwair field would fall in the category of wells that will only flow when pressure boosted (i.e. water injection support). This presentation will describe the well control risk assessment for this field and how it supports the use of a single barrier in the Shuaiba producing and water injection wells.

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| 10:00-10:30   | NETWORKING BREAK & OPEN EXHIBITION  
Sponsored by: COR International                                                                         |
| 10:30-12:00   | PANEL DISCUSSION: THE ROLE OF MANPOWER IN IMPROVING WELL CONTROL  
Moderator: Fredric Young, Chief Executive Officer, Dalma Energy & Co. LLC                              |

Technology and regulatory compliance at times become the focal points for industry well control efforts without recognizing the critical impact of human resources. This panel discussion will focus on the role of the workforce in ensuring continuous improvement in well control performance. This will include hiring policies, training and competency, employee retention, opportunities for advancement, and strategies for developing company loyalty.

### Practical Solutions for Underground Blowouts
Jim LaGrone, Well Control Engineering Manager, Boots & Coots

No two underground blowouts are the same and individual responses must be handled accordingly. This presentation will describe the surface indicators of an underground blowout, the diagnostic steps needed to verify it, and applicable solutions for a particular situation. Case studies will be presented as well as diagnostics and methods used for a successful outcome.

### New Approach to Observing Standpipe Pressure and Annular Discharge Pressure Provides Extremely Early Kick Detection Capability, Coupled with Automated Standpipe Pressure Control Simplifies the Well Control Process for Conventional and Managed Pressure Drilling Operations and Increases Operational Safety
Donald Reitsma, VP of Engineering-At Balance, Smith International

A novel method of using standpipe pressure and annular discharge pressure for kick detection results in extremely early kick detection without the need for delta flow measurement while the drilling pumps are on. With pumps off, a kick can also be detected by observing discharge pressure. Once the kick is detected the standpipe pressure can be automatically controlled to circulate out the kick and restore the well to a safe condition.

### Concepts and Misconceptions About Kick Tolerance
Helio Santos, President; Sandeep Valluri, Erdem Catak, Safekick Limited

Some important misconceptions about kick tolerance will be presented, highlighting the importance of doing the proper calculation to define whether it is safe to continue drilling. Some examples show that using a conventional kick tolerance approach, many wells are being unnecessarily abandoned. By using the correct approach it will be demonstrated that in many cases there is enough kick margin for drilling to proceed, which will lead to significant savings.
Mud-Gas Separator applications and other trig equipment recommended and economic approach to MODU upgrade requirements.

Middle East project. Included are comments on applying this process to rated over 10,000 psi and 300+ degrees F is discussed, along with lessons for critical HPHT well parameters. Secondary well control equipment HPHT issues, including choke control, hydrate prevention, Manifold &

A new, high tech element comprised of a proprietary super polymer is impervious to frac fluids and sour hydrocarbons. This element is more durable than rubber elements, and contains no steel, eliminating the potential for a spark. As operations continue into increasingly sour environments, implementation of "super elements" will become progressively vital for effective well control.

Evaluation of Ram Blowout Preventer Performance when Exposed to H₂S, CO₂, CH₄, and Jet Fuel in Combination with Temperature and Time

Gary R. Schaeper, Vice President Engineering; Danny Wolfe, T3 Energy Services, Stephen Smith, Saudi Aramco

A method for exposing ram blowout preventer pressure-containing and pressure-controlling seals and packers to harsh chemicals at various temperatures will be proposed. The effects of exposure to a combination of jet fuel, H₂S, CO₂, and CH₄ at temperatures between 24 degrees C and 149 degrees C on the sealing performance of ram blowout preventer seals and packers will also be discussed. The exposure and testing methods were jointly developed by Saudi Aramco and T3 Energy Services. T3 Energy Services conducted exposure and sealing performance testing on T3 Severe Service seals and packers for Model 6012 ram blowout preventers.

Well Control Rig Equipment Planning & Selection Strategy for Khuff Drilling Offshore UAE

Ted Littlechild, Director, EFC Group

HPHT zones beneath the Middle East’s Khuff formations must be considered when drilling these gas reserves. This presentation describes typical HPHT issues, including choke control, hydrate prevention, Manifold & Mud-Gas Separator applications and other rig equipment recommended for critical HPHT well parameters. Secondary well control equipment rated over 10,000 psi and 300+ degrees F is discussed, along with lessons learnt from more than 20 years of global HPHT experience and a recent Middle East project. Included are comments on applying this process to emerging HPHT operations in the Middle East whilst maintaining a measured and economic approach to MODU upgrade requirements.

Well Control Challenges in South of Oman Brown Fields Due to Water Injection

Mohammad Al Shukri, Senior Well Engineer Operations; Ghosh Kallole, Mohammed Al Ruqashi, Abdelmoneim Abu Al Khair, Petroleum Development Oman

Challenges being experienced while drilling and managing reservoirs in water flood supported fields will be shown. In addition, cases where completion strategy had to be modified due to unexpectedly high reservoir pressure and limitations in surface facilities which are not designed
to handle self flowing wells are described. Options like Managed Pressure Drilling and workover that are currently under consideration will be outlined.

The Successful and Unconventional Use of A Junk Shot Manifold on A Rig-Less Operation to Plug A Shallow Surface Casing Leak and Facilitate Well Killing Operations to Prevent the Escalation of A Well Control and Environmental Event

Steven King, Drilling Superintendent, Saudi Aramco

A conventional junk-shot manifold, used primarily by well control specialists to plug surface wellhead and BOP leaks in an emergency situation, was used to plug a shallow surface casing leak. Through a fracture, oil had broached the surface and was pooling in a crater near the wellbore. Subsequently, the well was bull head dead and secured. A rig was brought in to repair the well and place it back in production.

How To Ensure Oil Well Integrity During Wellsite Preparation for Workover Rig Move

Fares Al-Mansouri, Team Leader Safety; Mohammad Aftab Alam, Kuwait Oil Company

Prior to deployment of a rig, the wellsite area needs to be compacted and proper foundation has to be made to ensure the stability of the rig on location. The integrity of an active oil well is a matter of great concern while preparing the wellsite to enable workover rig deployment. A typical situation where the integrity of an active oil well was seriously endangered when the wellsite was being prepared for rig deployment will be described. The presentation will also discuss the onsite damage control action at the wellsite and effective measures to prevent its recurrence.

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can easily be present in many situations throughout the world. This case history will chronicle the problems encountered and the solutions used to successfully cap and kill a non-fire H₂S blowout.

A Study of How Well Control Operations are Affected by the Base Oil Fraction in Oil Based Mud
Johnny Petersen, Senior Scientist, SINTEF Petroleum Research

A dynamic simulator with advanced PVT capabilities has been used to study how kick detection and well behaviour during circulation are affected by different base oil fractions in the oil-based drilling mud. The study will show that a fairly low fraction of base oil will have clear advantages in some well control scenarios.

Modeling and Numerical Investigation of Fracture Ballooning in Naturally Fractured Reservoir
Mojtaba Pordel Shahri, Researcher; Mohammad Zeyghami, Petroleum University of Technology, Iran

Fracture ballooning will be introduced, previous modeling approaches will be overviewed and the latest models are compared with each other. In the second part a new model, which is an improvement of the previous models, will be presented. Sensitivity analyses on all of the parameters in the new model are investigated.

Modeling and Simulation of Flow Field Around Blowout Well
Ebrahim Hajidavalloo, Professor; Parham Omidian, Shahid Chamran University

The understanding of the flow field properties around the blowout well can be of a great help in making the correct decision during the killing program of the well.

16:30 CLOSING REMARKS