Offshore Engineer

OTC .05 SHOW DAILY

MONDAY 05.02.05


Mayor Bill White.


Gaurdie Banister, Jr.


Lisa Stewart.


Ken Arnold.

Leading the charge

TODAY OTC WILL ADDRESS ONE OF THE INDUSTRY'S key talking points when a diverse cross section of industry leaders convenes at 14.00pm to discuss the challenges and strategies necessary to meet growing world energy demand, forecast to reach 335 million boe/d by 2030.

Presented under the heading of 'Energy Leadership and Outlook', atop the list of issues to be addressed will be whether our industry is capable of ensuring an adequate supply of energy at an economically acceptable price. Other topics will include industry access to potential reserves; availability of appropriate technologies to develop these reserves in an environmentally friendly manner; and the growing concern of increasing CO_2 levels and greenhouse gas emissions.

As former US deputy secretary of energy and current mayor of the world's energy capital, Houston's Bill White will provide the keynote address for the panel with a wide-perspective on the issue and a local angle followed by views from operators including Shell Exploration & Production technical director, EP Americas Gaurdie Banister Jr, Stone Energy president and CEO David Welch and El Paso president, production and non-regulated operations Lisa Stewart. IFP chairman and CEO Olivier Appert and AMEC Paragon senior executive vice president Ken Arnold will provide the research and engineering company perspective.

A sea of resources, an ocean of knowledge

A message from **Rod Allan**, OTC .05 chairman.

Welcome to OTC .05

This is a busy time for all of us. The industry is booming, and OTC's attendance and exhibition are a direct reflection of our successes. We're all moving at a fast pace to sustain the constant research and development occurring in the offshore oil and gas industry.

OTC offers the perfect venue to combine all of our yearlong business trips and other meetings into four compact days. It is an incredibly efficient option to meet with hundreds of industry leaders, to explore business opportunities, to collect sales leads and to learn about new technologies that will last you for the next 365 days.

Not only will OTC provide you with practical knowledge and introduce you to new technologies, but you can enjoy many fun, social activities throughout the conference with your colleagues. OTC offers you opportunities to interact socially with other industry professionals living half a world away.

Join me at the ballpark on Tuesday night, for instance, when I throw out the first pitch as Major League Baseball's Houston Astros take on the Pittsburgh Pirates. You also can enjoy live music and great food at the outdoor exhibits. If you are new to Houston, take advantage of the many exciting attractions around the city. Visit the City of Houston booth in the lobby to find out all there is to see and do.

During your time at OTC, you'll have the opportunity to learn and to network. I hope you will pause and reflect on this vibrant time we are experiencing and the promising future ahead of us. As an integral part of the offshore industry, OTC will continue to showcase the latest offshore developments. It is a privilege to have served as the chair during such a robust period.

I hope to meet you during the next few days!

● **Rod Allan** *is director of technical services in Transocean Offshore's Eurafrican unit.*

Safety first

THE INTERNATIONAL ASSOCIATION OF OIL & GAS Producers (OGP) will tomorrow unveil its latest safety report. Based on analysis of almost 2.3 billion work hours of data – thought to be the largest database ever used to gauge the industry's safety record – OGP's *Safety performance indicators 2004* covers fatalities, lost time injuries and total recordable incidents as reported by 37 companies operating in 78 countries.

OGP, which has been publishing an annual review of upstream global safety performance since 1985, says the report is a perennial attempt to discover 'whether the industry is getting better – or worse – at ensuring that staff and contractors return to their families safe and healthy when their shifts are over'.

● Safety performance indicators 2004 *will be launched in Room 300 of the main conference centre tomorrow at 08.30. Space is limited to 200.*

Woelfel winner in the wings

THE WINNER OF THE AMERICAN SOCIETY OF Mechanical Engineers' Woelfel Best Mechanical Engineering Achievement Award will be announced tonight at a reception in the JP Morgan Chase Tower.

Finalists in the 22nd running of this prestigious annual technology prize are:

● Viking Technologies/Viking Engineering (**Booth 4441**) for the Unirough system;
● Varel International (**Booth 1470**) for its Drill Out Bicenter;
● Control Flow's WesTech Heavy Machinery (**Booth 3541**) for its Portable Drill String Compensator;
● Seacon Advanced Products/Lockheed Martin (**Booth 4153**) for the Hydralight; and
● Pilot Drilling Control (**Booth 2644**) for its Harmonic Isolation Tool.

The ASME's Woelfel award recognizes a product, device or system displayed at OTC that 'best reflects innovation and/or practical use of mechanical engineering in solving problems, improving design or maximizing performance'.

Last year Halliburton took home top honors for its 'DepthStar Tubing – Retrievable Subsurface Valve'.

ASME may also present the Woelfel Distinguished Innovation Award, which the judges award at their discretion each year for a specific innovation as contrasted with the larger system innovation in the Achievement Award. Last year the Distinguished Innovation Award went to Remora Technology for its HiLoad LNG Regas Terminal.

Inside

Early to rise

FOR THE EARLIEST RISERS, OTC IS OFFERING attendees a chance to start the show on a full stomach with a breakfast session at 07.30. Centered on a presentation by Nielsen-Wurster Group chief executive officer Patricia Galloway (*pictured*) on ethics and how ethical behavior manifests itself in everyday life, the breakfast session aims to address professional ethic questions facing engineers today in the international offshore arena including licensure, corruption and bribery and sustainability concepts in engineering projects.

As an added incentive, attendance in this session will also satisfy ethics requirement for the Professional Engineer's license. Certificates will be distributed at the close of the session.

WiFi For the e-mail dependent . . .

THE TECHNOLOGY SAVVY WILL BE given access to their ever-crucial e-mails via a free wireless network in the lobbies of Reliant Center.

Attendees will be able to connect online between sessions using their badge number.

In the spotlight

FOURTEEN PRODUCTS ON DISPLAY THIS YEAR HAVE been selected for special recognition under the OTC .05 'Spotlight on New Technology' program. They are:

- RMR riserless mud recovery system: a dual gradient tophole drilling system – AGR Subsea
- Stepped diameter tendon – Aker Kvaerner
- The Cameron DC all-electric subsea production system – Cameron
- 15k subsea safety system – Expro International
- CaTS cableless telemetry system – Expro International
- PoroFlex variable reach annular barrier tool – Halliburton Energy Services
- Altosonic III ultrasonic flowmeter for custody transfer – Krohne
- Carbon fiber rod utilization within subsea umbilicals for axial stiffness enhancement – Kvaerner Oilfield Products
- LNG Smart vaporization – Mustang Engineering
- Abrasive water jet cutting (AWJC) system for severing multistring conductors below seabed – Norse Cutting & Abandonment
- C100 H_2S scavenger mixer (offshore H_2S removal) – ProPure AS
- PressureXpress pressure-while-logging service – Schlumberger
- Continuous circulation system (CCS) – Shaffer
- Optical flowmeter – Weatherford

'In its second year, the Spotlight on New Technology program continues to serve as a stage to highlight the most innovative and significant offshore developments during the year,' says OTC .05 chairman Rod Allan. 'These recipients demonstrate the increasing technical edge that is required to explore and produce in ever-increasing water depths, and more remote and hostile environments. The products recognized in this year's Spotlight program will help bring offshore development to new depths – depths that just a few years ago seemed impossible.'

● *A stand-by-stand guide to the technologies deemed to have satisfied the OTC .05 judging panel's selection criteria appears on pages 6-8.*

OTC honors Vandiver and spars team

THIS YEAR'S OTC DISTINGUISHED ACHIEVEMENT Awards goes to leading academic and structural dynamics consultant Professor J Kim Vandiver, for his pioneering work in the area of flow-induced vibration, and to the teaming of operator Kerr-McGee and contractor Technip, for their success in delivering three generations of Gulf of Mexico spar floating production systems in nine year.

Vandiver (*pictured left*) is professor of mechanical and ocean engineering and dean of undergraduate research at Massachusetts Institute of Technology. A member of MIT's ocean engineering faculty since 1975, Vandiver is no stranger to OTC-related awards. He was the first recipient of the prestigious Arthur Lubinski prize for the best mechanical engineering paper back in 1984.

The Kerr-McGee/Technip teaming's third-generation cell spar at Red Hawk (*pictured top*), following on from their earlier innovative work on the Neptune and Gunnison spars, is recognized as having significantly reduced the economic industry reserve threshold for standalone deepwater field developments.

● *The award winners' achievements will be acknowledged in a special multi-media tribute during tomorrow's Awards Luncheon.*

Claire Farley.

Dan Pickering.

Energy in the round

OTC .05 KICKS OFF THIS MORNING AT 08.30 WITH AN invitation-only Energy Roundtable session looking at financing offshore exploration and production.

According to a recent International Energy Agency report, the E&P sector will need $4 trillion to sustain current production levels. Although oil companies are currently responding with increased production, as demand increases from developing nations, operators may struggle to keep up as deep offshore projects that have the potential to satisfy this need have long development times and costs will continue to rise.

Speaking to this topic will be Randall & Dewey Partners chief executive officer Claire Farley, Wood Mackenzie senior vice president Simon Frame, Petrie Parkman & Co chairman Thomas Petrie, and Pickering Energy Partners president Dan Pickering. Institut Francais du Pétrole chairman and CEO Olivier Appert will moderate the roundtable.

Topical luncheons

THERE ARE FOUR TOPICAL LUNCHEONS ON THE OTC .05 agenda today.

Simmons & Company International chairman Matt Simmons has titled his presentation 'The Big Surprises in 2005' as he looks over the issues that were not visible on anyone's radar screen or planning board as the 2004 OTC came to a close and attempts to cast some light on why these events came as a surprise to energy industry leaders.

Industry Canada energy and marine division director general Bruce Bowie will provide an overview of the 'significant challenges and future potential' of eastern Canada offshore as he discusses recent developments and describes measures being implemented to encourage new investment, maximize industrial opportunities and support the progress of the province that is home to the Hibernia, Sable, Terra Nova and White Rose developments.

'Innovative approaches to gathering systems for producing wells in deepwater' is the topic that will be addressed by Intec Engineering chief executive officer John Reed as he considers the role long-distance delivery management needs to play as the industry works to reach and effectively produce hydrocarbon deposits farther and farther from significant infrastructure – particularly as many of these reserves are smaller and tend to be located long distances from production facilities.

The hard reality that the megamergers of the late-1990s led to a decline in the amount of money industry spent on exploration and seismic, drilling and the associated technology development is exercising the minds of many in the industry including BP's technology vice president for exploration James Farnsworth. In his presentation, Farnsworth will focus on the growing emphasis on renewal of the industry's reserves base through exploration and exploration technology development and the 'more aggressive approach' to R&D that has been taken by majors in several key instances in recent times.

● *All luncheons run from 12.15-13.45.*

On the menu tomorrow

HIGHLIGHT OF DAY TWO AT OTC .05 WILL BE THE annual awards luncheon.

Giving the keynote address 'The Challenge of Energy Development in an Interdependent World', ChevronTexaco vice chairman Peter Robertson will discuss the foresight, cooperation and technology that the oil and gas industry needs to muster as we move beyond the era of 'easy energy'.

This year the Distinguished Achievement Award for Individuals goes to Massachusetts Institute of Technology Professor J Kim Vandiver for his numerous technical breakthroughs in the field of vortex-induced vibrations. Kerr-McGee Oil & Gas and Technip share the Distinguished Achievement Award for Organizations for their global relationship that has pioneered and delivered three generations of spar floating production systems inside nine years.

General sessions include 'Best Practices in Local Content Initiatives' and 'Demographics in Our Industry – Addressing the Upcoming Personnel Shortage', while panel sessions will take on the topics of 'Collaboration Among Operators and Contractors in Deepwater and Ultra Deepwater Fields' and 'Digital Energy: Case Studies Explore the Value Proposition'.

A message from **Rick Perry**, Governor of the State of Texas.

As Governor, I am pleased to extend greetings to all in attendance at the Offshore Technology Conference.

I have every expectation that this conference will once again be an overwhelming success. As accomplished professionals, you will have an opportunity to network and to share the expertise necessary to meet and excel at emerging challenges and opportunities.

This great nation has in large part been built through the innovation and enterprise of the men and women who have worked tirelessly to build the oil and gas industry. Its prominence has been a backbone of our economy, helping to create opportunity and prosperity.

Since 1969, the Offshore Technology Conference has promoted the development of offshore resources in the fields of drilling, exploration, production and environmental protection. Over the years, you have played an important role in furthering the industry's success, and I commend your commitment.

To those of you from out of town, Houston is renowned for its heritage and legendary for its hospitality. I encourage you to explore and enjoy the many attractions that this fine city offers – there is something here for everyone.

Anita joins me in sending best wishes for a successful conference.

Bicenter bits

Historically, bicenter drill bits have been used to pass through a smaller wellbore and drill an enlarged wellbore. Varel has enhanced the application of bicenter bits with its patent-pending drill-out technology feature, AFB (Advanced Force Balancing) cutting structure, and Casing-Saver cutter technology, features designed to ensure that no casing damage occurs during drill-out, extended pilot bit life and reliable directional characteristics (**Booth 1470**).

A bit of history in the making

Entrance to the newly renovated Wiess Energy Hall with (*below*) the donated bit from Varel.

A DRILL BIT VALUED AT $40,000 IS AMONG THE NEW features on display in the Houston Museum of Natural Science's Wiess Energy Hall, which reopens this week following extensive renovation work. The permanent exhibit, showcasing the application of scientific concepts and advanced technology in the oil and gas industry, is open to OTC attendees from today and to the public from Friday.

Donated by Varel International, the bit is a 6in x 7in x 4¾in MBC58, a unique, patent-pending one-piece matrix designed bicenter which passes through a 6in diameter wellbore, drills a 7in diameter hole, and allows 4¾in tools immediately above the bit.

Jim Nixon (*pictured*), president and CEO of Varel, whose Houston and Tarbes, France facilities manufacture the MBC series bits in sizes up to 17½in reamer diameter, commented: 'The Wiess Energy Hall is an icon to the Houston community, dedicated to the preservation and education of the global oil and gas industry. The timely remodel allowed us the opportunity to contribute some very progressive technology. As a company with more than 60 years in the drill bit business, we are excited to be a part of this prestigious display.'

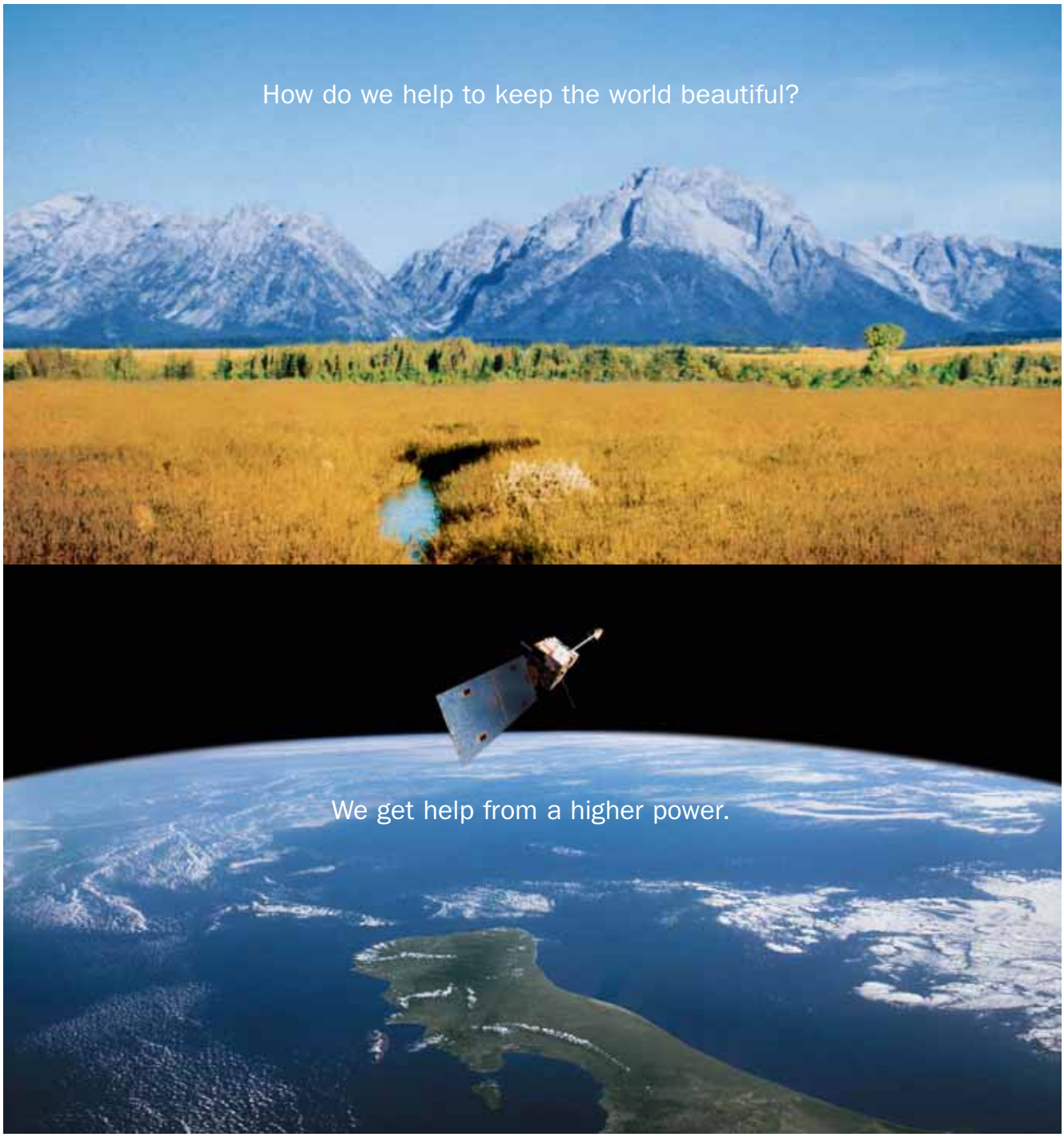
Paul Bernhard, who project managed the hall's recent makeover, added: 'We are delighted to accept this generous donation. The new bicenter drill bit from Varel is a great example of some of the most advanced drill bit design today. It is a nice complement to our new computer animation featuring the latest drilling technology.'

Since it first opened in 1994, the Wiess Energy Hall has set the global standard for museum displays devoted to the energy sector. Features of the recent renovation include new, photo-realistic animation and 60in plasma screens controlled by 15in touch pads. Updated content includes extreme drilling in remote areas of the world; underbalanced drilling; expandable tubular casing; coiled tubing drilling; through-tubing rotary drilling; and extended-reach and designer wells.

'The entire exhibit is dynamic, from the visitor-controlled wall-size projections to the touch-screen control panels that allow visitors to access multiple levels of information about any energy topic imaginable,' said Joel Bartsch, president of the Houston Museum of Natural Science. 'Everything is bigger, brighter and more fun – even the labels are animated.'

● *For tickets, or more information, visit www.hmns.org or call +1 713 639 4629.*

When it comes to operating an oil field, what happens above the ground is just as important as what happens below. That's why at ChevronTexaco we use a space-based technology called hyperspectral imaging to minimize an operation's effect on the environment. With it, we can see far more of the electromagnetic spectrum than is possible with the human eye in order to create a complete environmental map of a site. This allows us to decide where to place wells, pipelines and facilities with minimal disruption to delicate ecosystems. We also remain vigilant by using this technology to monitor the operation's impact over time. Protect what we have on earth from a perch high above it? What a beautiful idea.



ChevronTexaco

Turning partnership into energy.™

www.chevrontexaco.com/technologyintegration

Booth 1641 – Cameron
CameronDC all-electric subsea production system
The CameronDC all-electric system is the first subsea system powered by direct current and not by hydraulics.

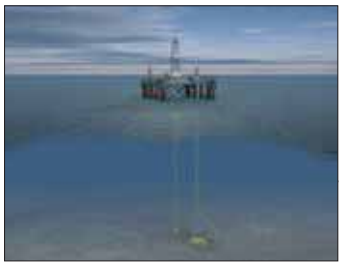
The advantage of this switch is OPEX/CAPEX savings, actuation speed and accuracy, high-speed communication and real-time condition monitoring, less environmental risks and more simplified components. The system, which consists of a surface power and communications system, power/communications transportation system, subsea actuation (valves and chokes), and controls system, is capable of operating efficiently in deepwater and at record distances from host facilities along with new technologies such as smart wells and subsea processing.

SPOTLIGHT ON NEW TECHNOLOGY

What's new and where to find it

OTC .05 SHOW DAILY'S STAND-BY-STAND GUIDE TO the products and systems selected for this year's 'Spotlight on New Technology' recognition program:

Booth 4331 – AGR Subsea
RMR riserless mud recovery system
Rather than use the traditional 'pump and dump' sacrificial mud systems for drilling the tophole or open hole sections of a subsea well, AGR Subsea has instead opted to adapt riserless dual gradient technology for the job with its RMR (riserless mud recovery) system. The RMR collects the well return from the openhole sections and thereby enables reuse of tophole drilling fluid and controlled handling and disposal of drill cuttings. AGR reckons its RMR technology will allow the drilling of wells that may not otherwise have been possible, while also mitigating shallow geohazards, facilitating the use of engineered fluid systems, eliminating emissions, drilling deeper topholes to save casing strings and offering significant cost savings.

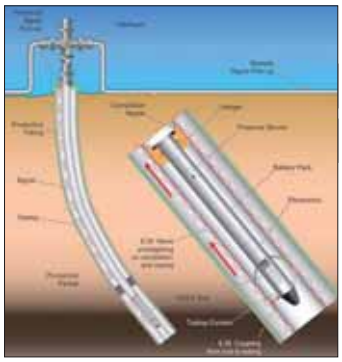


Booth 1125 – Aker Kvaerner
Stepped diameter tendon
The stepped diameter tendon provides an answer to a question that has been asked for many years: how to extend the commercial application of TLPs to water depths beyond 4000ft. The challenge lies in that conventional steel tendons become heavy in the deeper waters and thereby consume payload of platform. Earlier concepts have represented step changes in pressurized steel tendons or composite materials. According to Aker Kvaerner, the stepped diameter tendon is merely applying well-proven components in a new fashion. The lower sections are made up of small-diameter, thick wall pipe that can withstand the hydrostatic head. The upper sections are made up of large-diameter, thin wall pipe that has excess buoyancy to carry to the lower sections.

Booth 3931 – Expro International Group
15k subsea safety system
The landing string, a critical component in the protection and safety of personnel, the well and the rig, is the focus of Expro's 15k subsea safety system. The system is designed to provide well control function and disconnect capabilities during well installation, workover, intervention and well test operations using landing strings that provide for safe, low-cost well re-entry. This technology uses a patented high integrity ball valve system that enables the company's landing strings to provide reliable cut and seal ability in a single device. The intervention string provides the dual barriers required during worker operations on horizontal subsea christmas trees over a live well. Each system is certified to deal with all intervention situations and will seal after cutting coiled tubing and/or logging cable used for well intervention.

Booth 3931 – Expro International Group
Cableless Telemetry System (CaTS)
In an effort to remove dedicated cabling or instrument lines for monitoring reservoirs and

SPOTLIGHT ON NEW TECHNOLOGY



wells, Expro has developed a system that allows real-time information to be recovered from remote sensors using the available conducting (steel) well infrastructure. According to Expro, the Cableless Telemetry System, otherwise known as CaTS, offers operators advantages in the monitoring and control of wells with completion configurations that may require downhole wet connects to use more traditional electronic or optical telemetry systems. CaTS allows for real-time data, the flexibility for different sensor types, greater ease in configurations, minimal completion equipment penetrations and no cable to the surface for communication.

☛ Booth 3317 – Halliburton Energy Services Group

PoroFlex variable reach annular barrier tool

Halliburton's PoroFlex expandable completion system's variable reach annular barrier technology (ABT-VR) provides zonal isolation capability in open hole completions, allowing the use of production management tools and techniques that previously could only be deployed in cased hole completions. These techniques include production and injection control using downhole control valves or sliding sleeves, stimulation and conformance treatments.

☛ Booth 2070 – Krohne

Altosonic III ultrasonic flowmeter for custody transfer

Designed to replace turbines and PD meters, the Altosonic III is a dedicated three-beam liquid ultrasonic flowmeter for light hydrocarbon products that offers .15% accuracy in custody transfer applications. Krohne says the meter eliminates problems with clogging, scaling or blockage while reducing pressure loss. And with no moving parts, lifecycle costs are dramatically reduced since little to no maintenance or recalibration is necessary. The Altosonic III is bi-directional and the three beams offer built-in redundancy in the unlikely event of a sensor failure.

☛ Booth 1125 – Kvaerner Oilfield Products

Carbon fiber rod utilization within subsea umbilicals

Far more efficient than steel due to its high stiffness-to-weight ratio, carbon fiber technology has been introduced for use in umbilicals in extreme water depths – 2000m and beyond. The carbon fiber rods are used to enhance the axial stiffness of the cross section in the umbilical. The rods are incorporated in the umbilical along with the other functional elements, such as steel tubes, electrical cables and fiber optics.

KOP reckons another advantage of this design is that the rods are in direct action within the umbilical, which contributes to the stiffness without the delay of break-in that is typical for aramid armoring.

☛ Booth 1353 – Mustang Engineering

LNG Smart Vaporization

Field tests have shown that the LNG Smart Vaporization process used to efficiently and economically regasify LNG can reduce fuel gas consumption and NOx and CO_2 air emissions by as much as 90% across a wide range of temperatures and humidity, resulting in significant operating cost savings and benefits to the environment. Specially designed to use commercially available equipment, the process is equally at home in new or existing facilities, either onshore or offshore. Key components are industry-standard fin-fan air exchangers used with downward flow and LNG vaporizer heat exchangers. The process is generally used in parallel with Submerged Combustion Vaporizers (SCVs) significantly lowering their annual gas consumption and NOx and CO_2 emissions. The process also can be used in lieu

Booth 2505 – Schlumberger
PressureXpress pressure-while-logging service
Unlike conventional formation testers that also incorporate fluid sampling capabilities, the PressureXpress reservoir pressure-while-logging service is a wireline tool that has been developed specifically for formation pressure and fluid mobility testing.

According to Schlumberger, the streamlined design of the high-quality pressure/mobility testing tool enables measurements as low as 0.004mD/cp to be taken in a fraction of the time required by multifunctional formation testers, minimizing the risk of differential sticking and subsequent fishing operations and replacement costs. One customer reported that employing PressureXpress in the field had reduced its well costs by 30%, overall well cycle time by 65% and increased field production by 30%.

Booth 5033 – Weatherford
Optical Flowmeter
The first flowmeter to use sonar optical technology, Weatherford's Optical Flowmeter is said to provide greater accuracy, reliability and stability than traditional electronic meters for real-time downhole flow measurement of liquid and gas. It is designed for permanent downhole installation and is deployed as part of the production tubing during the completion.

The Optical Flowmeter features an innovative array of spatially distributed fiber optic-based sensors to measure the propagation of pressures associated with turbulent flows and acoustic signals in the flow. According to Weatherford, the flowmeter's benefits include zonal production allocation, early identification of production decline, direct determination of the productivity index, and fewer surface well tests and surface facilities.

SPOTLIGHT ON NEW TECHNOLOGY

of seawater vaporization technology, for example Open Rack Vaporizers, reducing the potential harmful effect on marine life as the only by-product is fresh water that can easily be treated for potable consumption.

Booth 4255 – Norse Cutting & Abandonment
Abrasive Waterjet Cutting (AWJC) system
Abrasive Waterjet Cutting Hailed as a safe, fast, cost-effective and environmentally friendly method for cutting multi-string casing in plug and abandonment and conductor slot recovery projects, Abrasive Waterjet Cutting tooling can be quickly mobilized to run downhole through a rotary table, from a skid or platform deck and from a vessel simultaneously with rig operations. Norse Cutting & Abandonment says its cold-cutting technology produces clean, level, even cut edges, enabling easier and safer handling of the sections to be recovered and an ideal surface for landing out a whipstock for slot recovery. The system is powered by a high-pressure pump and mixing chamber, delivering a powerful jet of waterborne abrasive particles through an umbilical to the nozzle in the cutting tool. The tool and all cutting parameters are controlled and monitored through real-time computer-based data tracking. Proven in water depths of 350ft, the system is capable of cutting five string configurations, cemented or partly cemented, in a single pass.

Booth 4331 – ProPure AS
C100 H_2S scavenger mixer (offshore H_2S removal)

A new spin on conventional H_2S scavenging technology, the ProPure system helps reduce costs and is said to be more environmentally friendly. H_2S scavenger is supplied in a controlled manner to an annular injection chamber whereby, through patented pipe geometry, the injected scavenger solvent is transformed into minute droplets and almost instantly atomized, resulting in an immediate rapid mass transfer of H_2S to the scavenging agent, explains ProPure. The complimentary C100 injection mixer has a high turndown ratio in scavenger injection and helps avoid clogging and malfunction. The in-line concept is designed to support successful pipeline pigging at all times and requires minimal maintenance. Operating units in the North Sea report typical H_2S scavenger consumption levels of 2400-2600 USgal/d associated with conventional chemical injection methods were reduced by 30-35% after switching to the ProPure C100.

Booth 3741 – Shaffer
Continuous Circulation System (CCS)
For years drillers have sought the capability of continuous fluid circulation in order to maintain constant bottom-hole pressures, enhancing drilling performance while reducing non-productive time. The Continuous Circulation System (CCS) achieves this goal that allows drilling fluid circulation to be maintained while making connections with conventional drill pipe during the drilling process. Suitable for integrating into a single system, including iron roughnecks, blowout preventers, power slips, mud manifolds and snubbing units, the CCS makes continuous circulation during connections possible by creating a sealed pressure chamber around the tool joint to be broken. Pressurized drilling fluid is introduced into this chamber equalizing the pressure inside and outside of the connection. Shaffer says the self-contained CCS, designed to work in conjunction with the rig's rotary table and top-drive drilling system, can be installed on almost any top-drive equipped rig in a matter of hours.

Booths 3317 & 1276 – Halliburton/Petronas

Technical excellence on tap

COLLABORATION BETWEEN HALLIBURTON AND Petronas has resulted in the establishment of a highly specialized upstream oil and gas training facility on the site of Malaysia's Universiti Teknologi Petronas (UTP). The new 'technical excellence center' (TEC), providing training support in geology and geophysics to both new graduates and oil industry professionals, is the first of its kind to be set up by Halliburton outside of North America.

'One of the main challenges that the exploration and production industry faces is its aging expertise and the need to develop its human capital to extract the best out of the technology and its assets,' says Dr Rosti Saruwono, vice president of Petronas' education division. 'Petronas is therefore looking to industry service providers to assist us in training and developing local resources.'

Mark McCurley (*pictured*), a vice president in Halliburton's production optimization divison, adds: 'This is a major commitment by Halliburton for a training facility in the eastern hemisphere, which is the largest economic and energy consumption growth area in the world today.' The collaboration is a winning strategy for both companies, according to McCurley. 'As this generation of employees begins retiring over the next five years, the need to invest in the training and development of the younger generation becomes crucial.'

Like the company's other three TECs – in Texas, Colorado and Mexico – the Malaysian center will have the latest broadband and videoconferencing technology, allowing trainees to participate in the global lectures given by subject-matter experts anywhere in the world and also to interact with participants at the other TECs. The first training semester began recently with studies covering cementing services, production enhancement and completion tools. The center currently has a total of 26 students from both Halliburton and Petronas from Asia, Africa and the Middle East.

Booth 1641 – Cooper Cameron Valves

Putting it all together

THE COOPER CAMERON VALVES (CCV) DISPLAY IS bigger and bolder at OTC .05 as a result of its purchase of the flow business of PCC Corporation, including General Valve, PCC ball valves, TBV, Techno, AOP Industries and CW Valve Services earlier this year.

Hailing the acquisitions as 'established brands that complement our own', CCV president John Carne said: 'They will address a wider set of needs for all our customers, in the oil and gas and associated industries.'

Carne added that the CCV Engineered products division, let by Willy Findlay, now had 'three true market leaders' in its portfolio: the Cameron fully welded ball valve, now complemented by a complete line of bolted-body sizes and trims; the Orbit rising-stem ball valve line, and the double-block and bleed TwinSeal line from General Valve.

And added to the well-known WKM, Demco and Nutron brands of CCV Distributed products, under Jim Wright, are the Massachusetts-based TBV – a high-end ball valve maker with severe service and cryogenic capabilities – along with Techno check valves and AOP products.

VALVSERV, the CCV aftermarket parts and service business led by Duane Morgan, continues to provide OEM aftermarket services for this expanded line-up from its 17 aftermarket service centers worldwide.

Booth 4405 – Nalco

Tested to extremes

SUGAR LAND, TEXAS-BASED NALCO HAS EXPANDED its corrosion inhibition line to include a family of products designed, tested and approved for extreme production challenges, including deepwater, high pressure, high H_2S content, and cold temperatures.

The Enercept Extreme line of corrosion inhibitors was created in response to the industry's need for high performance, environmentally friendly products that are able to stand up to the harshest production environments, notes Gary Cooper, marketing manager for Nalco's asset integrity team.

'The era of easy oil and gas production is over,' he adds. 'Enercept Extreme products are designed on a heritage of continuous improvement and rigorous testing. Most importantly, they are field-proven in severe environments – from Alaska, to the North Sea, to the deepwater coast of Brazil – prior to carrying the designation.'

Booth 4255 – Karmsund Maritime Offshore Supply

Leak test report

NORWAY'S KARMSUND MARITIME OFFSHORE SUPPLY (KaMOS) reports that the gasket it invented for leakage testing of flanged connections is finding favour internationally, with BP, Total and Unocal (Thailand) among the latest companies to acknowledge the 'huge savings' this innovation brings in relation to cost, time and safety.

The gaskets have been used by Total in Assalayah, Iran over the past five years and are now specified for all the company's major projects. BP is using the gaskets on its North Sea platforms and, through shorter shutdown periods when repairs need to be done, is reputedly saving up to $3 million a day in the process.

ExxonMobil has employed the KaMOS gasket on its Kizomba project to good effect, likewise Unocal both onshore and offshore Thailand. 'Subsea they now have an opportunity to test flanges before the system is set in process, a test they had earlier been unable to do,' says KaMOS.

Booth 3063 – C&C Technologies

Third Hugin delivered

LAFAYETTE, LOUISIANA-BASED C&C TECHNOLOGIES has taken delivery of another Hugin 3000 autonomous underwater vehicle (AUV) from Kongsberg Maritime. Rated to 3000m water depth, this third Hugin in C&C's AUV fleet (*pictured*) is slightly longer than it predecessors and is powered by a Kongsberg Maritime aluminum oxygen fuel cell battery which provides a mission endurance of more than 50 hours before resurfacing. The vehicle will feature an enhanced survey sensor suite, basically consisting of multibeam echo sounder, side scan sonar, sub-bottom profiler and conductivity, temperature depth system.

C&C Technologies also recently placed an order for a Hugin 4500 (with 4500m depth rating) for delivery later this year.

AROUND THE BOOTHS

Booth 3125 – Maritime Pusnes

Underwater fairlead chain stoppers for Dalia FPSO

TWELVE FAIRLEAD CHAIN STOPPERS (FCS) HAVE BEEN delivered by Maritime Pusnes for installation underwater on the hull of the Dalia FPSO, due to go into service for Total on deepwater Angola block 17 in the second half of 2006.

Maritime Pusnes, an Aker Kvaerner company, was contracted by Technip-Coflexip last year to provide on-vessel mooring equipment for the FPSO, currently under construction at the Samsung yard in South Korea.

These FCSs have gained in popularity for spread-mooring applications since they were first developed in 2001 for use on Brazil's *Barracuda* and *Caratinga* FPSOs. They will be employed during the installation and securing of the Dalia FPSO's 12-line mooring system, which includes 114mm diameter chain.

The design involves the combination of a swivelling fairlead with a chain stopper (*pictured*). The stopper mechanism is located at the end of an extended arm thereby enabling the fairlead to more easily overcome rotational friction and follow the mooring line direction. Monitoring of line loads is also possible by using load sensors located on the fairlead arms.

Eight of these FCSs are currently on order and soon to be installed on the SBX platform being built at the Amfels yard in Texas.

● Maritime Pusnes is also working on an advanced arctic crane offloading system for Sevmorneftegaz's Prirazlomnoye platform in the Pechora Sea, 60km from the Russian mainland. Hydramarine is supplying the cranes for this system, which will enable crude oil offloading from the platform – a steel caisson in 20m of water with the former Hutton TLP topsides – over to a shuttle tanker taking account of the best direction with respect to ice, wind and current.

Booth 4441 – Aanderaa Data Instruments

Joining forces

NORWAY'S DATAINSTRUMENT AND AANDERAA Instruments have merged to create a 'stronger technical and commercial' entity under the name of Aanderaa Data Instruments.

The new-look company is focusing in the main on three business areas: oceanography, environmental monitoring and weighing systems. Daughter companies Aanderaa Instruments Inc, Mipeg Inc and Mipeg Ltd will continue to operate under their existing names.

AADI managing director Rune Hansen said each area had its product focus but would in future have access to the whole 'so we can deliver turnkey solutions utilising our full product range and expertise'.

All of the company's products are now being produced by a combined manufacturing unit in Bergen.

Booth 4441 – CTour Process Systems

Norway's year zero

AN INNOVATION BY NORWEGIAN WATER TREATMENT specialist CTour Process Systems is expected to make a meaningful contribution to the Norwegian government's 2005 goal of zero harmful discharges for its offshore fields.

The CTour process is based on extraction of hydrocarbons from produced water using condensate from the production stream. The condensate acts as a solvent, extracting the water soluble aromatic components from the water into the condensate phase. The condensate and the oil particles coalesce into larger, low-density droplets that are efficiently separated from the produced water by a downstream separating unit.

The proprietary technology is scheduled for full-scale installation at Statoil's production facilities at Statfjord, and ConocoPhillips in co-operation with CTour has successfully tested the process at its Ekofisk 2/4-J platform. The test results contributed to ConocoPhillips' decision to move on with further studies, reports CTour. An EPCI-contract for implementation of the CTour process is scheduled to begin by mid 2005.

Wiess
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INTERACTIVE, EXCITING AND EDUCATIONAL, the Wiess Energy Hall is all-new from the ground up. Advanced computer graphics and hands-on interactive stations take you on a mind-expanding experience that starts with the birth of the universe and the formation of hydrocarbons to the evolution of drilling equipment, 4-D seismic technology, the science of refining, alternative energy sources, and much, much more. It's geology, geography and high-octane excitement around every corner.

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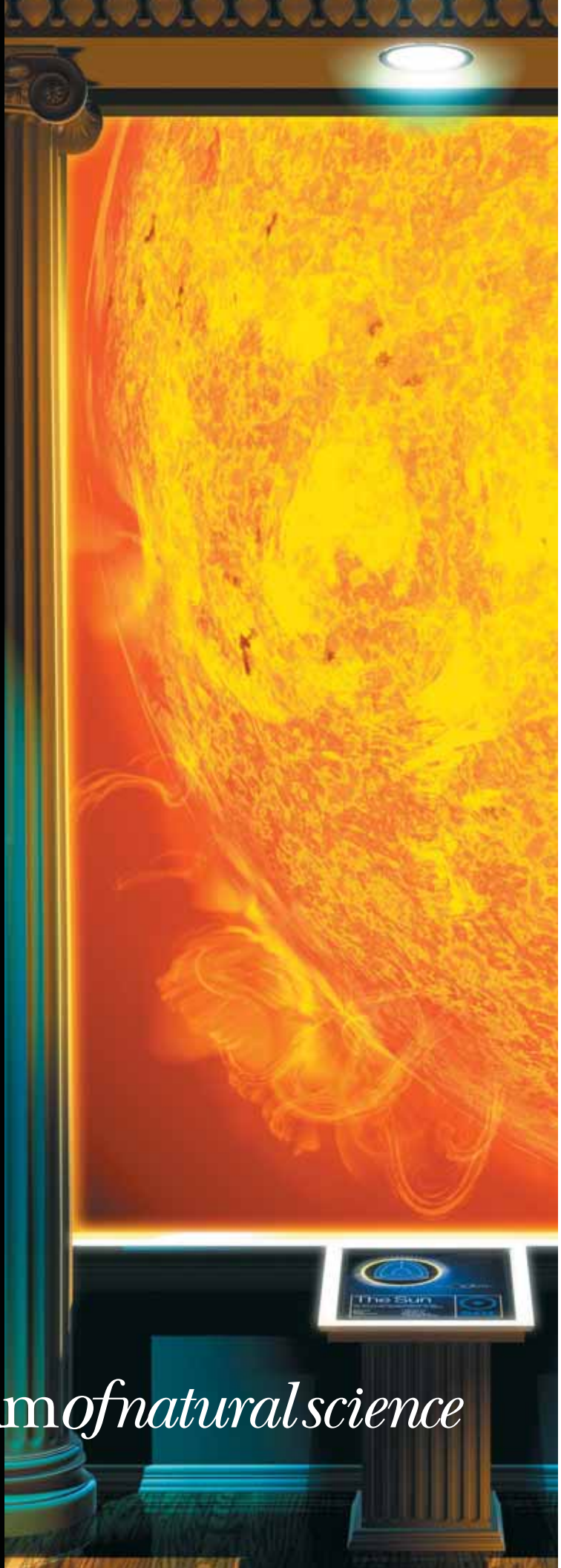


the Houston Museum *of natural science*

AROUND THE BOOTHS

Booth 2546 – EV Offshore

The all-seeing eye

OFFERING HIGH QUALITY IMAGES OF PIPELINE interiors of a wide range of diameters, the Excalibur camera module recently added to EV Offshore's subsea inspection systems is hailed as 'unique in its ability to cope with low light situations and to rotate continuously'.

The core element of the new system is its 360-degree rotation capability, which offers unrestricted viewing to the pipewall. The camera can also be fitted with a down view module, instead of the snub-nose, to allow simultaneous down view.

Measuring just 2⅜in (60mm) and weighing only 2.2kg, the Excalibur is compact enough to negotiate 3D radius bends in pipelines with diameters as small as 84mm. The Excalibur was developed EV Offshore earlier this year in order to carry out a complicated emergency riser inspection deployed from a platform to water depths in excess of 650ft (200m).

Booth 4971 – Enerpac

Pumping up the power

LIKE OTHER PUMPS IN ITS Z-CLASS FAMILY, ENERPAC'S new ZU4 electric torque wrench pumps are designed to deliver ease of handling and use, higher oil flow and bypass pressure, cooler running and require 18% less current draw than comparable pumps. These pumps are said to be ideal power sources for all torque wrenches. The pumps are offered in two maximum operating pressures – 10,000psi and 11,600psi – and the reservoir capacity is 1-2 gallons.

Heavy-duty bearings extend pump life by reducing friction, reducing surface loading and lowering bearing stresses. The pump's high-strength, molded composite shroud protects motor and electronics, while providing an ergonomic, non-conductive handle for easy transport.

Remote control units with low-voltage pendants provide additional safety for the operator. Brush design lasts 4-times longer than current designs and features an 'auto-stop' shunt to prevent commutator damage from normal brush wear. Auto cycle feature provides continuous cycle operation of the torque wrench as long as the advance button is pressed. Pumps can be used with or without auto cycle feature.

The LCD readout provides pressure display and a number of diagnostic and readout capabilities Enerpac says have never before been offered on a portable electric pump. The pump's 1.7hp universal electric motor provides high power-to-weight ratio and low-voltage operating characteristics.

Booth 7310 – Parker Instrumentation

Going with the flow

PARKER INSTRUMENTATION HAS LAUNCHED A 25MM version of its successful Pro-Bloc one-piece double-block-and-bleed manifold. The current smaller bore versions of this product family have found widespread application, primarily for connecting remote monitoring instrumentation to process lines and pipework.

According to Parker, the 25mm full-bore design significantly extends the application diversity, by providing a high flow rate capability unit that can form part of the processing system itself.

Like all Parker Pro-Bloc double-block-and-bleed manifolds, the new 25mm version is machined from a single piece forging, eliminating many of the joints demanded by conventional designs based on discrete components. 'As with existing 10mm versions, the new 25mm Pro-Bloc allows engineers to specify a manifold solution that can substantially reduce weight and the number of potential leakage paths in a processing system,' notes Parker Instrumentation's market development manager Brian Rice.

The large bore of the new manifolds makes them particularly suitable for processes involving viscous media, or media with entrapped solids. It also makes them less prone to the blocking effects of hydrate formation in offshore applications.

Booth 5055 – JD Neuhaus

Air lift

LIFTING EQUIPMENT SPECIALIST JD NEUHAUS IS targeting hazardous areas with the introduction of high-performance Profi air winches to its range.

Designed for safe operation in dusty or dirty conditions, the new winches house an innovative vane motor with integrated brake function, consistent with the design philosophy of offering fewer overall components inherent in the company's chain hoist series.

Available in a range of lifting capacities from 500kg to 3000kg, the winches have high rope capacities and are simple to operate via a variable speed level control at the winch. No additional air lubricant is required, helping to keep maintenance costs to a minimum.

The Profi Lifter 1000, one of a new range of air-operated winches from J D Neuhaus.

An emergency air shut off valve also serves as an additional safety feature.

Booth 5179 – Sea Trucks

Green light for two Jascon newbuilds

China's Nantong Shipyard is to undertake the hull and superstructure steel fabrication for the Sea Trucks Group's new DP3 pipelay/construction vessel, with the fleet designation *Jascon 18* (*pictured*). Confirming the agreement today, Sea Trucks also revealed that well-known Norwegian naval architect Vik Sandvick has been commissioned to finalize the detailed design based on concepts developed by Sea Trucks.

The vessel – 150m long and with a beam of 37m and a depth of 15m – will have a 12 knot transit speed and be marketed worldwide later this year. Tenders for its completion will be issued to the yards shortly, with delivery scheduled for the second half of 2007.

The pipelay system, based on S-lay configuration, will be arranged below deck along the centerline of the vessel. *Jascon 18*'s 300t tension lay capacity can be upgraded to 600t to enable the vessel to lay pipe in over 2500m of water. A large unobstructed open deck will offer plenty of pipe storage with cranage facilities – main crane capacity 900t/1200t – to support a variety of construction and installation activities in deep and shallow water. An accommodation facility with 400 beds will also enable the vessel to perform hook-up and commissioning work.

Sea Trucks Group president Jacques Roomans said: 'We are continuing our newbuilding program with this state-of-the-art vessel. Only last September the group launched its *Jascon 5* DP3 pipelay/construction vessel, which has so far already completed, and very successfully, two projects in Qatar and Iran without any downtime. She is now operating in India under a four-year contract with Iran's IOEC. Our technical and commercial success with this vessel has demonstrated that the market welcomes the use of modern DP construction vessels which enhance productivity and save cost.'

Plans to build a 'baby' version of *Jascon 18* have also been announced by Sea Trucks. Again offering DP3 pipelay/construction services, the new vessel, designated *Jascon 25*, will be 120m in length and feature accommodation facilities for up to 250 personnel, a 450t heavy lift and 50t pedestal crane and, initially, a 100t tensioner. Construction of this vessel is to be fast tracked by Sea Trucks and its 100% Nigerian sister company, West African Ventures, with a view to executing West African projects from early 2006 onwards.

Booth 1480 – Schilling Robotics/Sub-Atlantic

Subsea equipment firms pool their resources

Schilling Robotics of Davis, California and Sub-Atlantic of Aberdeen, UK appear at OTC .05 in the new guise of alliance partners.

Early in April, the two companies announced they were pooling resources for sales, service, product development and marketing. The alliance would, they said, benefit customers by providing a wide range of subsea vehicles, vehicle components, and control systems that can now be purchased from a single source, and by strengthening worldwide support for alliance products.

Colin Millum, Sub-Atlantic's joint managing director, said no other single entity offered 'as diverse and complete a product range' in the subsea intervention field. The new alliance offers ROVs, tether management systems, communication and control systems, electric and hydraulic manipulators, tool skids, electrical and hydraulic thrusters, hydraulic power units, valve packs, compensators, pan & tilts, rotary and linear actuators, and cable/connector assemblies. 'Custom engineering projects will expand and continue to be a key strategic area,' added Millum.

Tyler Schilling, CEO of Schilling Robotics, commented: 'By pooling the technical expertise of both companies, the alliance can enhance current products and create new ones more quickly and efficiently. Our products will be more capable, reliable, long-lasting, and efficient than competing equipment, thus lowering the cost of ownership for the life of each product.'

MARKET FORECASTS

Subsea's rising star continues its ascent

In the first of a series of *OTC .05 Show Daily* reports, **Infield Systems** (**Booth 2340**) charts the rise and rise of the subsea market.

The subsea market remains one of the most dynamic sectors in the offshore industry, offering as it does a cost-effective way to monetise reserves, often fast-track and in deeper waters, at a time of high commodity prices.

The next five years is set to see a whole variety of developments taking place across the globe from the Barents Sea to the Australian Blight with a mix of major multiwell deepwater programmes, single tiebacks and integrated subsea and facility schemes. All this activity leads to a total expenditure forecast in excess of $16 billion/yr, including drilling and completion of subsea development wells and all associated pipelines and control lines.

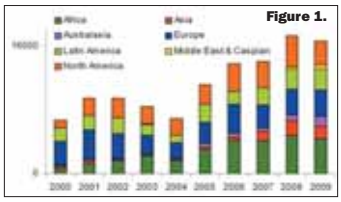
The growth and development of West Africa has been evident for a number of years and in the subsea sector it is forecast to command the majority share – up to 29% – of the expenditure over the next five years as new facilities come onstream and satellite fields are tied back to existing hubs to maintain production levels. The region has already seen the development of several megaprojects and this trend is forecast to continue, providing strong demand for subsea equipment destined for projects ranging from Akpo in Nigeria to Zinia in block 17 Angola.

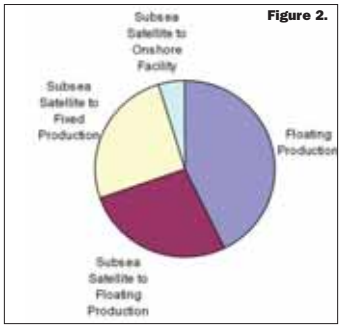
Although, as *Figure 1* shows, the European share of the subsea market expenditure has decreased dramatically from 47% in 2000 to a forecast 20% in 2009, it still remains a significant region in terms of overall forecast expenditure. Our view of Europe extends beyond just the North Sea and includes the Norwegian Sea, West of Shetland and Irish waters. However, beyond Ormen Lange and Snøhvit, there are few large greenfield developments on the immediate horizon that stand a chance of being developed before the end of 2009, as the full promise of Norway's Skarv, Victoria, President/Onyx prospects remains uncertain.

Still, there was a strong commitment to the region by BP at the beginning of the year. The company looks set to increase recovery throughput from reserves on such brownfield sites such Schiehallion and Foinaven fields through the implementation of additional infill drilling and the application of state-of-the-art subsea technology. In addition, the cross-border agreement achieved by the Norwegian and UK governments appears to have given fresh impetus to projects along the border, such as Blane and Enoch.

Subsea to shore developments such as Ormen Lange and Snøhvit are growing in significance in the subsea market. *Figure 2* shows the split of types of subsea developments that are due to take place between 2005-2009. Subsea wells connected to a floating production vessel remain the dominant concept type. A total of 69% of all predicted subsea wells are either to be connected directly to a floating facility located on the same field or tied back as satellite wells to an FPSO located on an adjacent field.

Nonetheless, fully 5% of wells are forecast to be tied back to shore, with projects ranging from deepwater Mediterranean fields – such as Sienna, Simian & Sapphire and Abu Sir off Egypt, to the gas fields located off Australia's North West shelf such as Gorgon and Jansz, to be tied back to the proposed new Barrow Island LNG plant. The percentage may not be large but it is growing rapidly and it is one area where the potential knock-on impact is disproportionately large, as the industry spends over $12.6 billion/yr of new fixed and floating production facilities.





A message from **Larry Kellner**, Chairman and CEO, Continental Airlines.

Welcome to Houston. Many of you have traveled to this conference from all over the world, and I hope that you chose Continental Airlines, Houston's hometown airline, to bring you to this spectacular city.

While there are still a few places that we don't fly to from our hubs in Houston, New York, Cleveland and Guam, we can still get you wherever you need to go thanks to our membership in SkyTeam, the world's fastest growing airline alliance. SkyTeam's nine member carriers, including Aeromexico, Air France/KLM, Alitalia, CSA Czech Airlines, Delta Air Lines, Korean Air and Northwest Airlines, offer more than 14,000 daily flights to 658 destinations in 137 countries. That's more than 20% of the available seat miles in the world.

Not only do we offer the most service, we also offer the best service. Continental has consistently earned awards for its superior product and exemplary customer service. Most recently, Fortune *magazine, for the second consecutive year, named Continental its No 1 Most Admired Global Airline, in its 2005 World's Most Admired Companies rankings. Continental outperformed its global competitors based on scores in nine different categories – quality of products and services, quality of management, employee talent, innovation, financial soundness, social responsibility, long-term investment value and use of corporate assets and 'globalness'. Continental was also included in* Fortune*'s 2005 Top 50 list, which ranks all companies, across a wide variety of industries, that appear in the World's Most Admired Companies issue. Continental won major awards at the 2004 OAG Airline of the Year Awards including Airline of the Year, Best Airline Based in North America and Best Executive/Business Class.*

Our commitment to the fundamentals of our business – providing clean, safe and reliable air transportation with the best group of professionals in the industry – has kept us focused during the last few years of challenge and change in the airline industry. We've spent our time preserving the things that our customers really want. For us, it's keeping the pillows, blankets, magazines and meals at meal times. It's picking up the phone 30 seconds faster. It's finding creative ways to make your airport experience quick and easy. It's going the extra mile to make sure that your flight is a comfortable one.

We're doing the right things, in the right places, with the right people, and our efforts have clearly set us apart from our competition. I'd like to personally thank the many participants at the 2005 OTC for choosing Continental for your travel needs. We hope you enjoy your stay, because out of the 268 destinations we serve worldwide, there's only one place we call home and that's right here in Houston, Texas.

Show on the grow

To little surprise, OTC has again increased in size from previous years. While the 2004 event boasted a massive 397,750 net sq ft of indoor and outdoor exhibits, this year that total has broken the 400,000 mark with 410,000 net sq ft being used by a total of 2087 exhibiting companies from 32 countries.

'We were able to add 192 new companies this year by reconfiguring the exhibit floor after removing the shuttle in the back of the hall,' explains OTC .05 chairman Rod Allan. 'We also have an increased international presence this year on the exhibit floor – more than 660 companies from outside the US will be exhibiting, totaling 99,000 sq ft. OTC continues to be the only annual event representing all regions of the offshore industry with attendees from more than 110 nations and exhibitors from more than 30 countries.'

And while the majority of exhibits are located inside Reliant Center, outdoor exhibits are also growing in popularity. There are more than 50 outdoor booths this year, accounting for some 22,300 net sq ft, up from 18,350 net sq ft last year.

As an added attraction to this area, OTC has nominated a theme for each day of the event highlighted with a variety of live music and daily entertainment that will include massage chairs and caricatures between 11.00 and 13.00 and again at 14.00 to 16.00.

The schedule includes:

- Today: 'Go Texan Day' with performances from the Ben McPeak Band.
- Tuesday: 'World Fusion Day' as provided through the sounds of Moodafaruka.
- Wednesday: 'All That Jazz' with the sounds of the Gary-Michael Dahl Band.
- Thursday: 'Adios Amigos', with more from the Ben McPeak Band.

Take me out to the ball game

OTC and the Houston Astros have again teamed up to provide some post-conference baseball entertainment by offering show-goers discounted tickets for the three games this week (today, Tuesday and Wednesday) against the Pittsburgh Pirates.

Tuesday will be the official 'OTC Night at the Ballpark' with conference chairman Rod Allen again doing the honors with the first pitch.

- *OTC attendees interested in catching some of the action may buy tickets at the Astros booth in the lobby outside the entrance to Hall B, order online at mlb.mlb.com/NASApp/mlb/hou/ticketing/group_offshore.jsp (password: otcastros) or at the Minute Maid Park box office. First pitch for each night is scheduled at 19.05.*

OTC .05 SHOW DAILY

Help us to help you

OTC exhibitors with news items to be considered for the *Show Daily* are invited to drop them off at the *Offshore Engineer* display (Booth 1501).

Job hunters

Attendees that are 'between opportunities' or hoping to improve their present situation will likely discover something to their advantage by visiting OTC's Oilcareerfair (**Booth 1276** and **Booth 1277**).

Hailed as the oil industry's largest networking opportunity of its kind, the Oilcareerfair allows companies and job seekers to meet by putting recruiters together with candidates in one area on the show floor.

Companies participating in the fair include: El Paso, Eni, Petronas Carigali, Saudi Aramco, Schlumberger, SGF Global and Worldwide-worker.

The organization also has a dedicated website www.oilcareerfair.com that lists all vacancies at companies one month before and after the show.

VON FLATERN'S VIEW

Lost in translation

Strolling the aisles of the OTC exhibition, one cannot help but ponder the unique and shifting relationship between operator and service industry engineers. At once antagonistic and symbiotic, its dynamic changes with every movement in the price of crude. When prices and activity are up, say the oil companies, the service companies push the cost of their services up unreasonably. Likewise, service company engineers will swear that as soon as the cycle turns the oil companies take every opportunity to drive down those prices. As a result the industry has come to be made up of two distinct engineering cultures, a dichotomy seen most clearly whenever the industry discusses 'technology uptake'.

Maintaining their traditional distrust of one another's motives, service engineers blame operator tightfistedness for the slow adoption of new technology, while operators insist innovation must first be made affordable before it can be cycled into common usage. As often happens when cultures clash, neither seems able to grasp what the other is complaining about. At the base of this historic falling out is the immutable truth that the hearts of all drilling engineers beat with the desire to create the cheapest connection possible between the surface and reserves.

Likewise, production engineers have traditionally been happy to declare a well a success if they get a good log across the target interval and a good cement job on the production string. Both disciplines talk about wellbore quality and probably mean it but in the end what they really want is something low-cost that will not raise the eyebrows of their budget-conscious masters.

Service company engineers, on the other hand, are driven by a need to deliver the perfect well with a rifle-barrel-smooth, rock-stable bore, able to deliver optimum production immediately upon completion and throughout the well's lifetime.

Operations engineers want to know exactly the dayrate or other unit cost of every service and product in firm numbers they can show to the keeper of the departmental purse. Service engineers are more likely to answer direct questions about price with responses couched in terms of rig time savings, increased production and longer well life – all served up with a dash of disdain for the naïve posing questions about specific cost. In short, the two are so divided as to have developed different languages.

The source of this communication breakdown can be found in engineers' very nature. Engineers are a breed apart, the best of which, like artists and musicians, are born to be just what they are. Natural engineers are, by training and by instinct, cost conscious. They know the proper answer to any engineering problem must include not only the 'how' but also the cost – and a very costly solution is rarely the right one.

To be fair, engineers are not exactly 'cheap', though to the untrained eye they may sometimes appear to be. A more accurate label perhaps would be 'economically rational'. Engineers take the phrase 'more bang for the buck' quite literally and so are not strictly opposed to spending money so long as the results are worth the cost.

As anyone who has ever attended an SPE golf tournament can attest from the thousands of dollars worth of clubs lined up outside the pro shop before tee time, engineers do indeed spend money in the proper cause. But they won't spend a dime for an outcome deemed less than critical. Indeed, the bohemian in most engineers seems to believe that clothes should be chosen solely for their ability to provide protection from the elements (though it must be admitted there are many exceptions who are both good engineers and good dressers). Thus the same engineer with a $2000 set of golf clubs sees no contradiction in buying a new golf shirt, jeans and tennis shoes at a discount megastore for about as much as a banker would pay for his knockabout topsiders.

Being economically rational, the engineer understands the value of good golf clubs in terms of gains in control and distance and so the expenditure makes good sense. Paying for fashion cannot be so measured and thus is an irrational expense. This economic ethos not only creates a communications gap between the two breeds of engineer but also informs the 'never be first' corollary. Unlike the instinct to spend logically, this intense risk aversion is not an innate trait but one wholly learned from superiors whose primary concern is next quarter's financials.

Service engineers who have never spent time in a modern E&P company have the same difficulty with this sentiment as they do understanding their brethren's over-sensitivity to costs.

With the industry firmly split it into two cultures with two languages, then, the solution to the technology uptake question might not be as simple as finding the right translator. Perhaps a good interpreter could open a booth at the next OTC.

● **Rick von Flatern** is US editor of *Offshore Engineer* magazine.

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