

TECHNOLOGY APPLICATIONS

Dennis Denney, JPT Senior Technology Editor

Permanent Monitoring—Kuster Company and Estrella Group of Companies have introduced their new KPerm line of permanent monitoring solutions. The real-time permanent downhole quartz sensor allows life-of-well accurate pressure and temperature data monitoring to gain reservoir knowledge and improve production efficiency. The touch-screen surface acquisition unit is a low-powered permanent-gauge acquisition unit with an intuitive-perceptive interface, which requires no specialized training. The system can operate in both hot and cold environments. The unit can be powered from AC or DC power and, thus, is suitable for remote operations with solar power. The system can be configured through satellite or radio link for remote transmission of data or use a direct link where a local network is available. Recently, a digital quartz permanent downhole gauge was installed above the production zone in a THUMS-Unit well. The gauge was installed in a mandrel and linked independently to the surface acquisition unit through a permanent downhole cable which was clamped to the completion string. The downhole cable was terminated through the tubing hanger and wellhead with a pressure-sealed outlet and crossed over to a surface cable, allowing the gauge signal to be transmitted and stored by the surface acquisition unit.

For additional information, visit www.kusterco.com.

Combined SCADA and GIS Information—CygNet Software has released its CygNet 7.2, which combines a geographic-information system (GIS) and asset-management information with its operational surface-control and data-acquisition (SCADA) module. This integration ensures that both systems maintain their individual system of record status, thus avoiding data-replication processes. The release improves the methods of and performance for accessing and storing massive amounts of data. The software collects, manages, and distributes data. The platform leverages the network-centric archi-

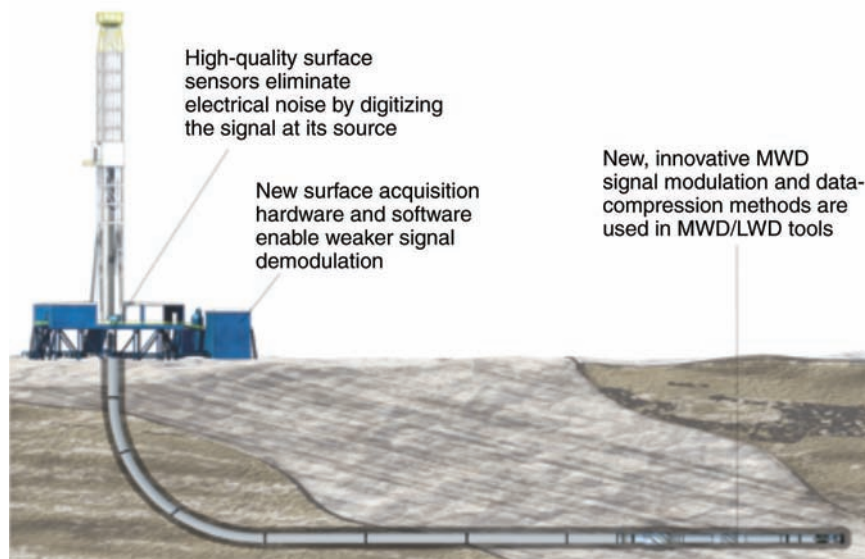


Fig. 1—Schlumberger's Orion II platform enables MWD and LWD services to run faster and farther.

ture used in high-bandwidth video and imaging applications. GIS-based asset management, SCADA data, and information from core business applications are consolidated. Integrating GIS-mapping capabilities with facilities and equipment monitoring and with threshold alarms enables companies to analyze historical trends, react to current conditions, assess the business value of each asset, and make real-time business decisions. The enhanced historical-database recovery enables immediate access to near-term operational data while allowing the import of longer-term data in the background. New capabilities in data analysis and in intelligent compression limits repetitive data values stored in the historian, ensuring data quality and performance. Enhanced Gas-Measurement Repository replication eliminates network-connectivity issues and makes electronic flow-measurement-data collection and distribution more reliable and efficient.

For additional information, visit www.cygnetscada.com.

Data Transmission and Improved Resolution—A new telemetry platform that enables geosteering of deep wells is available on Schlumberger logging-

while-drilling (LWD) and measurement-while-drilling (MWD) systems. On a recent well, drillers were able to drill faster with more data for real-time decisions. The Orion II telemetry system (Fig. 1) has a capacity of 60 log curves at 120 bps, each with a 6-in. sampling rate, while drilling ahead at 250 ft/hr. Downlink commands were sent in real time without affecting delivery of measurement data to surface. The system enables communication with instrumented bottomhole assemblies whether drilling at high penetration rates or operating logging equipment in wash-down mode. More data and better-resolution images can be transmitted in real time, enabling better drilling decisions. Both drilling efficiency and geosteering accuracy are enhanced. This telemetry enhancer combines new data-compression technology, housed in each tool, with new surface and downhole sensors that modulate/demodulate signals and overcome interference from drilling and rig noise, even in harsh environments. The new software suppresses noise while decoding and enhancing signals received through the mud column as far as 7.6 miles downhole.

For additional information, visit www.slb.com/orion2.

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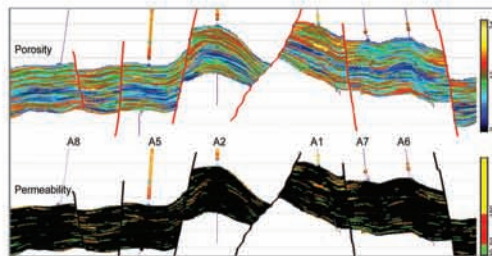
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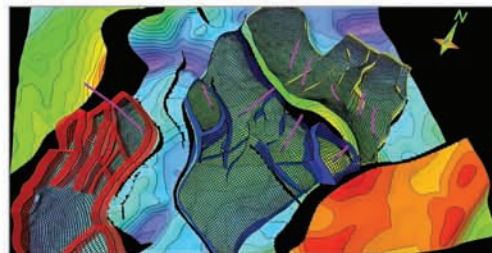
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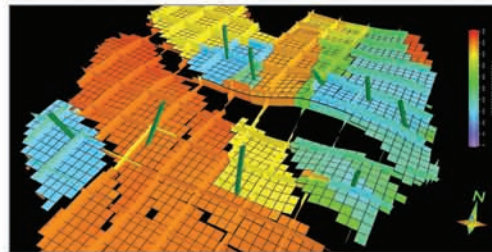
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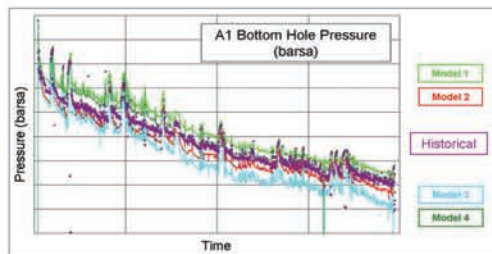
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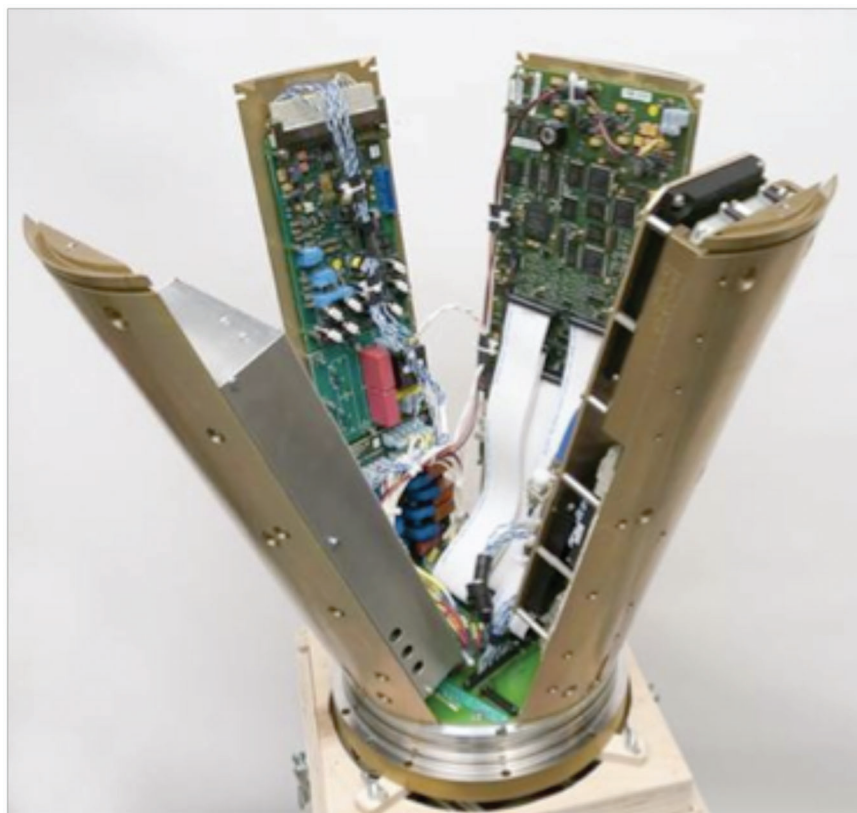


Fig. 2—FMC 200e subsea control system with the new SEM600 series electronics and KS200e software.

Subsea Control System for Gas Compression—As gas reservoirs lose pressure, the natural-flow production decreases. The Åsgard field in the Norwegian Sea is experiencing this challenge, and StatoilHydro plans to use subsea compression to produce additional gas. FMC Technologies has qualified a subsea control system for gas compression. Several technology-qualification programs were established by StatoilHydro to address a variety of requirements. Key requirements included ultrahigh availability, quick response time, and minimum fault-tolerance levels. Other challenges were integrating complex auxiliary and subsystems, comprehensive remote conditions, and performance monitoring of the complete compressor system. Antisurge control and control of the compressor's active magnetic-bearing system also were addressed. Data processing and communication is provided by the SEM600 series subsea-electronics module, which includes high-speed (1 Gbps) communication (**Fig. 2**). The system also can operate autonomously through safety-certified

electronics, electrical control actuators, and open-standard plug-and-play interfaces. The 200e subsea control system featuring the new electronics and the KS200e software is being installed on approximately 200 subsea installations and has proved its flexibility and versatility on several complex applications.

For additional information, visit www.fmctechnologies.com.

Underbalanced Drilling Roller-Cone Bits—Varel International announced its A-Force roller-cone-bit series, built for underbalanced applications, including air, foam, and mist. These bits use a heat-shield disk between the seal and the bearing. This shield acts as a thermal insulator, protecting the seal from excessive thermal energy, thereby lowering the operating temperature for the seal and extending seal life. The bits also are equipped with a conical seal gland that positions the seal in such a way that it can handle pressure fluctuations better and still maintain a preferred sealing location and interface. This is especially important with the high

internal bearing pressures that can be experienced in air, foam, and mist drilling. A more robust and more tight-tolerance journal bearing is capable of supporting increased levels of weight on bit. Material improvements include a new grease formulation that is stable at increased operating temperatures; a more wear-resistant hard-metal inlay, shown to provide a 54% reduction in wear; redesigned head forgings to increase leg strength, reduce bit length, and improve steerability; and High-Energy-Tumbled processed carbide inserts.

For additional information, email info@varelintl.com.

Coiled-Tubing Tractor—Western Well Tool used its IT-470 Tractor (**Fig. 3**) to reach an openhole section with coiled tubing (CT) during an acid stimulation and production-logging tool (PLT) run. The acid-stimulation tool and PLT were run in a 28,203-ft measured depth extended-reach water-injection well with 5,986 ft of horizontal 6¹/₈-in. open hole. A window at 22,217 ft was used to exit the 7-in. casing and create the sidetrack. The tractor has a pulling capacity of 14,500 lbf at 1,700 psi differential. The bottomhole assembly (BHA) for the acid run consisted of a motor-head assembly, circulation subassembly, the tractor, and a nozzle subassembly. While running into the hole, lockup occurred at 21,980 ft inside the 7-in. casing. The tractor was actuated, and the CT was run in hole. As the BHA approached the window, the speed was slowed to 3 ft/min until it passed through the window. Once the BHA was clear of the window and into the openhole section, normal operating speeds of 15 to 20 ft/min were resumed. Normal speeds were continued until reaching total depth, at which point a ball was dropped to activate the circulation sub. Once the ball landed and opened the ports, acid stimulation of the openhole section began in stages while pulling out of the hole.

For additional information, visit www.wwtco.com.

Monitoring Subsea Cutting—EV Offshore has developed a range of subsea video cameras for monitoring abrasive-cutting operations (**Fig. 4**). The

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Fig. 3—Western Well Tool’s IT-470 Tractor for use with CT.



Fig. 4—EV Offshore’s bespoke-designed SL40 camera.

cameras were used to decommission one of the largest fixed installations in the North Sea without the use of divers, thereby substantially enhancing safety standards. Decommissioning success requires that all subsea abrasive-cutting activity is monitored properly so that the cuts are made accurately. A total of 17 video camera systems, along with subsea halogen lights, subsea cabling, and eight video monitors, enabled engineers to view the activity in real time. The camera systems were engineered to function in harsh subsea environment. The cameras were Class II-insulated to meet electrical subsea operational standards and withstand the force of the backscatter of particulates propelled during the high-pressure jetting of a cutting operation. With its powerful halogen lights and high-fidelity color cameras, the entire cutting operation could be tracked and supervised with great efficiency and accuracy. The cameras were designed with internal variable light-emitting-diode lights and a variable-focus control to ensure sharp images.

For additional information, visit www.evoffshore.com.

Engineering Workflows—Paradigm has released its Sysdrill 2009 well-planning and drilling-engineering application. This release combines advanced well planning and drilling engineering in a single application that allows drilling engineers to plan wells quickly, safely, and accurately to reduce drilling risk and uncertainty. There is a significant reduction in data-entry time for engineering analyses. An advanced input/output interface enables loading third-party data. The result-driven analysis provides quick identification of drilling problems, and geological data are incorporated for improved planning and visualization. This release is tightly integrated with the company’s Geolog petrophysical log-interpretation software to provide real-time geosteering solution, offer workflows to support creating log-scale geosteering models ahead of drilling, facilitate interactive updates to geosteering models while drilling, and enable preplanning of wells using updated models. The interactivity is an example of multidisciplinary workflows. **JPT**

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