



Downhole monitoring has been supplying accurate and real-time downhole information to operators worldwide since 1987

Going downhole to support production

As operators' reservoirs and subsea portfolios become ever more complex and as pressure increases to both maximize production and extend the field's lifecycle, the need for accurate, downhole information has never been more important

Information on pressure and temperature, for example, can not only warn the operator of threats to production and flow assurance but also provide crucial support to existing production systems, such as Electrical Submersible Pumps (ESPs) and well optimisation,

It is therefore good timing that Emerson Process Management and its Roxar business unit are celebrating 25-years of downhole monitoring solutions this year.

The Roxar brand's leading position in downhole monitoring began in 1987 when Smedvig and Lasalle Pressure Data Services joined forces to form IPR AS, leading to the deployment of monitoring solutions on Statoil's Gullfaks A field. In 1990, Roxar (then known as Smedvig) became the sole owner of the PDMS business and in 2009, Roxar was acquired and became a business unit of Emerson Process Management.

Emerson's Roxar downhole monitoring systems and high pressure and temperature gauges, are today deployed in production, injection, observation and highly complex multi-zone intelligent wells across the world,

where they are generating reliable and real-time downhole information crucial to reservoir operations.

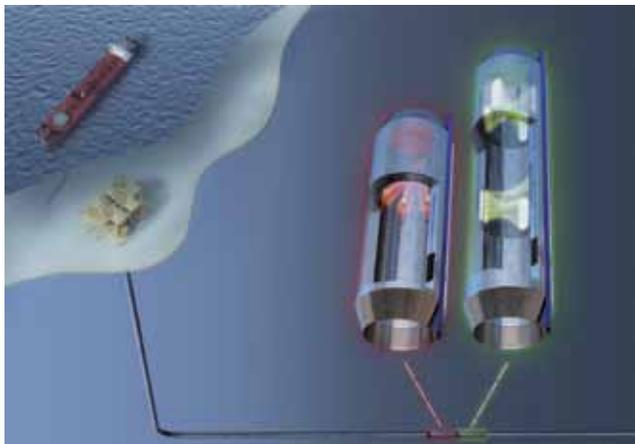
Having installed the first Roxar PDMS (Permanent Downhole Monitoring System) on Statoil's Gullfaks A field in 1987, close to 1,400 Roxar downhole gauges have now been installed worldwide - testament to the products' reliability, longevity and innovation. Statoil's Gullfaks C production platform in the North Sea, for example, has been using the same Roxar downhole gauge, uninterrupted and without maintenance or replacement for nearly 21 years.

In addition to Roxar PDMS and the Roxar downhole HS gauges, other downhole solutions include the Intelligent Downhole Network (IDN), which allows operators to install up to 32 instruments on a single cable; and the Roxar Downhole Wireless PT Sensor System, which measures pressure behind the well casing in subsea wells. There is also the recently launched Roxar Downhole Flow Sensor System which, for the first time, generates multiphase flow measurements from downhole in the well.

The single piece of data operators want to know most about, as part of their reservoir



Close to 1,400 Roxar downhole gauges have now been installed worldwide



Downhole flow sensor system generates multiphase flow measurements from downhole in the well and deep in the reservoir



Roxar Fieldwatch – a comprehensive field monitoring system

THE CUSTOMER: TALISMAN NORWAY

The Field: The Gyda Field, North Sea, 270 kilometres from Stavanger. In early 2011, Talisman Norway completed two new wells on the Gyda field supported by Electrical Submersible Pumps (ESPs).

The Challenge: To deploy a downhole monitoring system which generates crucial temperature and pressure information to support production systems as well as ensure optimal ESP operation. The monitoring system must be able to operate in high temperature (HT) applications and work effectively alongside the ESPs.

The Solution: Talisman selected Emerson Process Management's Roxar downhole HS gauges, due to their ability to operate in robust and high temperature applications and meet highly demanding delivery times.

The Roxar downhole HS system consists of the latest generation HS gauge designed for the most extreme conditions and is part of the Roxar Integrated Downhole Network (IDN). The systems state of the art electronics and market leading technology has been designed to minimize the influence of noise induced onto the downhole cable. The system also includes the Roxar Downhole Network Controller (DHNC) card which receives electrical power and exchanges information through field operator and third party communication systems.

The Results: Following comprehensive onshore testing to demonstrate that the Roxar downhole HS gauges could operate effectively alongside ESPs, the gauges were deployed in early 2011. The fast track manufacturing and delivery ensured that the onshore testing, carrier design and delivery were achieved within record time.

The field results showed that the gauges operated according to Talisman's requirements without any discernable interference from the operational ESP. In the first well, the HS gauges have been functioning at temperatures of up to 153 degree Celsius (°C) and have been used to maintain the ESPs operating under optimal conditions. In the second well at temperatures of 131°C, the Roxar HS system functioned successfully throughout whilst experiencing extreme vibrations and shock after a number of start-up attempts of the ESPs.

The executive summary is part of a larger report/case study on the partnership between Emerson Process Management and Talisman.

monitoring activities today, is the flow from individual wells. Yet, the growing complexity of well architecture, with an increase in multilateral and multi-zone wells, has led to operators having to settle on total production flow data rather than flow from specific well

zones. That's why the Roxar Downhole Flow Sensor System represents such a step-change in reservoir monitoring and flow assurance, providing full multiphase measurements - fluid fractions and flow rates - from either single bore or multilateral well configurations.

Finally, there is Emerson's production management software, Roxar Fieldwatch, a specialised Windows-based field monitoring system which enables E&P operators to 'watch their fields' remotely and where real-time data can be accessed directly at the desktop via a graphical user interface.

The rapid retrieval and display capabilities of the software provides the user with the ability to quickly visualize data and identify trends, patterns or areas of interest for further analysis. In this way, it meets operator demand for an integrated and intelligent reservoir monitoring and asset management system, where the economic impact and risk of reservoir management decisions can be fully assessed.

Whether it be supporting production activities (as in the case study with Talisman), measuring multiphase flow rates downhole or tackling the twin threats of sand and corrosion, downhole monitoring today is providing operators with increased insight and control over their reservoir operations and improved production.

With a track record of 25 years and counting and a reputation for innovation, accuracy and robustness, Emerson Process Management and its Roxar business unit are leading the way. ■

This article was written by Vincent Vieugue, Vice President, Roxar Flow Measurement, Emerson Process Management