Connecting the Geologist to the Digital Oilfield

In today's digital oilfield, bringing geologists into the workflow with geophysicists and reservoir engineers is vital to maximise the potential of every well.

Jane Whaley

David Harrison, Managing Director of HRH Geological Services, is a man with a mission; to bring geologists to the digital oilfield, alongside their geophysical and engineering colleagues.

"The 'digital oilfield' is the buzz phrase in the industry at the moment, pursued in particular by the large service companies like Schlumberger and Halliburton," says David. "Our aim in HRH is to connect the geologist to the digital oilfield, and change the way both geologists and geological data is used."

Moving from paper to digital data

"Geology at the wellsite has always been an analogue function, with geologists gathering data to produce a completion log at the end of drilling. Even though geologists were using computers for this - in 1991 HRH were the first company to create a computerised log drawing system - the final product was still a paper log and the workflow hadn't actually changed in 25 years. The data collected to produce this log was not being used further in the process."

"The drilling side gather data at the wellsite and pass it on to a central office or system where it is available to everyone in real time." David continues. "Geological information, such as core data, geological

Photo: Halfdan Carstens

Geologists who started on the rigs 40 years ago are being replaced by a younger, more computer literate generation.

Photo: Jane Whaley

David Harrison studied geology at Nottingham University. After 14 years working worldwide with Gearhart Geodata, David set up HRH in 1989 to provide tools for the wellsite geologist.. With offices in the UAE, Malaysia, Indonesia and the UK, HRH employs 64 people, based out of the head office in Aberdeen, Scotland.

descriptions and rock types, was missing from this data pool."

HRH have addressed this issue by developing software which turns geological data into more useful digital formats, bringing it into digital oilfield, and allowing it to be included in the workflow and available to all asset team members. "Not only does the data become an integral part of the workflow process, but so does the geologist," David says. "This is a vital step forward in integrating wellsite data and securing maximum production from a well."

Focus on geologists

The company was founded in 1989. The rationale then, as now, was simple: To provide more and better tools to the wellsite geologist.

HRH is concentrating on the role of the geologist at the wellsite; a market in which apparently no other company is exclusively focussed. It has been a successful stratagem, with HRH software used by a wide range of oil companies from super majors to small independents. The majority of UK completion logs are produced on HRH software.

This software is known as the Gravitas Suite. It consists of a powerful central database allowing the geologist to acquire data in real time and store both current and historical well information. Data can be visualised as lithological and core logs or used to generate charts, summaries and reports, all from a consistent, accurate data set.

"Unlike other aspects of the drilling process, geology is manpower intensive," explains David. "Someone needs to physically look down a microscope or describe the rocks. However, not only has the workflow not changed greatly in 25 years - the workforce hasn't, either. This has created a partial block on technological change, but the geologists who started on the rigs 40 years ago are now retiring and are being replaced by a younger, computer savvy generation, who expect software and technological tools to assist them."

"We are passionate in our belief that the next generation of wellsite geologists will be technologically focussed. In HRH we recruit young geologists and train them in both wellsite techniques and the Gravitas software and then send them to work with oil companies wherever they are needed.

Unlocking the potential

"The workflow of the wellsite geologist is changing, partly as a result of our software," David continues. "Companies working worldwide want to be able to send their data to a central point to be accessed by everybody, and the geologists need to become part of that workflow. Oil companies also need geological data of a consistent quality, so that it can be used with confidence in other workflows. The whole point of these digital **Operation Centres** is the production and modification of geological models in real time, while the well is actually being drilled. It is crucial that digital geological data is available in this workflow."

"The right technology can unlock the full potential of the digital oilfield," says David. "With the knowledge of geologists and the power of our software to link the wellsite to the asset teams, geological information can now be fully integrated into the digital oilfield."

Real Time Operation Centres

In recent years many oil companies have been moving towards the 'Real Time Operation Centre', whereby operations and management of drilling in remote areas is handled from a single shore-based centre.

Vital to this is the Digital Oilfield, using technology developed to collect data from all components in the field. Sensors located within the drillstring, for example, monitor data such as bit orientation and rock density, which is transmitted to the Operation Centre, to be compared with seismic data and reservoir models. Changes to drilling parameters can be determined and activated within minutes.

Information emanating from the well and field can be utilised by everyone in the asset team, from geologists and engineers to financial analysts. Decision-making is both improved and speeded up. Members of other teams in the same centre can also access this data when planning future developments, leading to better resource management and enhanced productivity and efficiency.

The cost savings inherent in using a Real Time Operations Centre are impressive: the industry consultancy Cambridge Energy Research Associates has estimated that going digital saves around 7% of operating costs.

Photo: Harald Carstens

Statoil's operation centre in Stjørdal outside Trondheim is handling wells drilled in the Norwegian Sea.