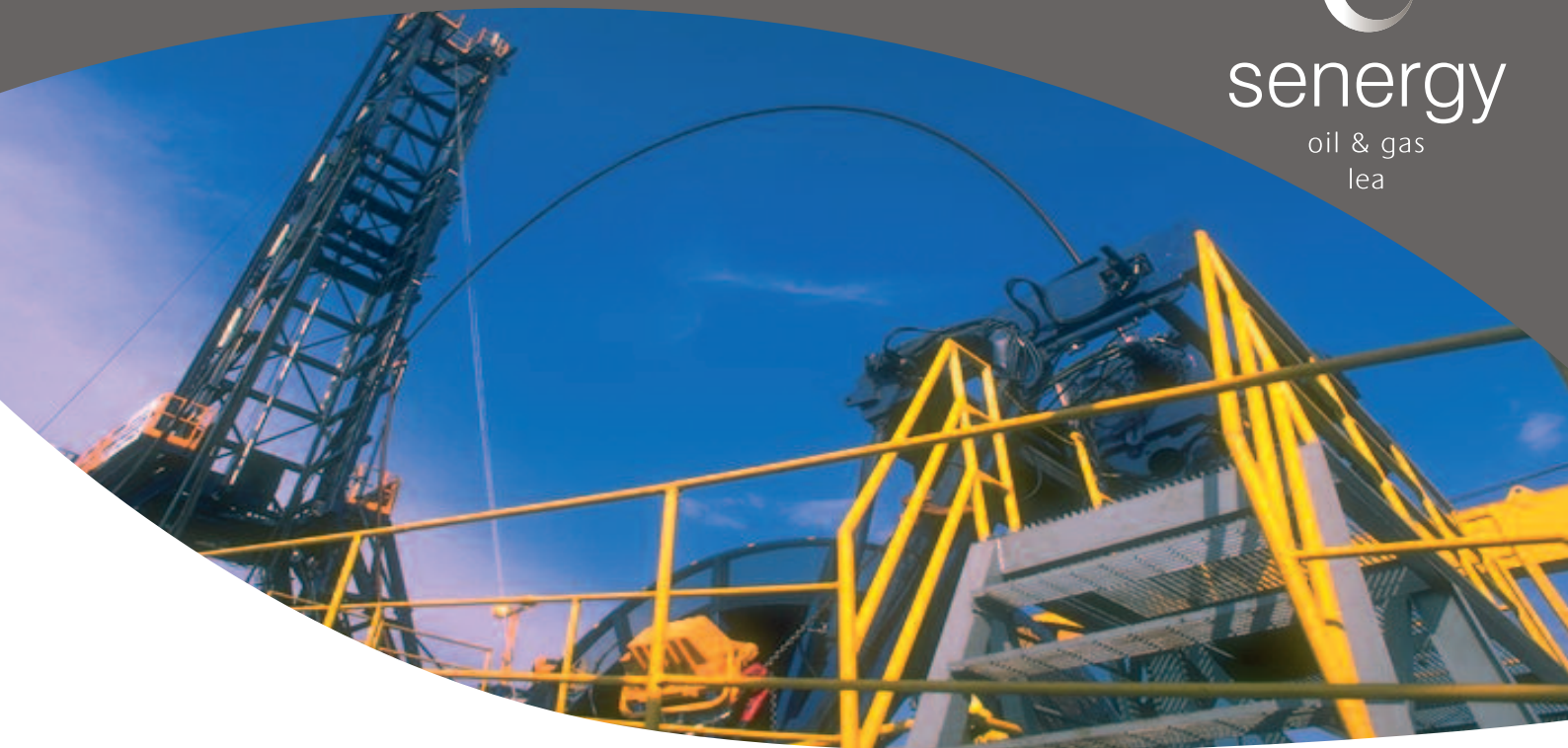




senergy

oil & gas
lea



Advanced drilling techniques

Senergy acquired its capability in advanced drilling techniques through industry leader **LEA**ding Edge Advantage in August 2008, creating 'Senergy LEA'.

"The acquisition of advanced drilling techniques (ADT) specialists, LEA, adds a unique skill set to complement Senergy's existing expertise in well engineering and wellbore performance".
Dave Reed, Managing Director, Senergy Oil & Gas Ltd

As a result, Senergy boasts the largest independent well engineering consultancy specialising in advanced drilling techniques, a phrase originally coined by LEA, covering the following applications:

- MPD** – (managed pressure drilling)
- UBD** – (underbalanced drilling)
- TTRD** – (through tubing rotary drilling)
- SSTTRD** – (sub sea through tubing rotary drilling)
- CTD** – (coiled tubing drilling)
- HPHT** – (high pressure/high temperature)
- ERD** – (extended reach drilling)

The unique and International ADT experience, gained from 10 years of operations in some 23 countries globally, has resulted in a number of world and industry firsts. As a result of the acquisition, Senergy LEA is exceptionally placed to offer unparalleled levels of customer service to the ADT market. The complementary expertise from within the Senergy group, in support of ADT operations (subsurface and wellbore performance

groups), means that we can, from the initial concept right through to project execution, manage the design and development of your ADT project; from single wells through to full field redevelopment or rejuvenation.

Managed pressure drilling technology

MPD is an 'adaptive' drilling technique commonly characterised as "Walking the Line." Simply put, this 'line' is the pressure between pore and frac pressures which, where manageable, may enable drilling in places previously considered impossible by conventional means. The intent is not to invite a true state of underbalanced conditions; instead, it is more precisely to control, manage and contain annulus returns. MPD may be accomplished by many means including combinations of backpressure, variable fluid density, fluid rheology, circulating friction and hole geometry. Containment used in this context means that MPD is focused not on creating a pressure draw down across formations, which may produce hazardous flow products, but on 'Walking the Line' instead; in other words, to contain any flow incidental to the operation.

On behalf of Shell E&P, we completed the successful introduction of coiled tubing managed pressure drilling to their Shell Gannet Alpha asset - the first such operation to be undertaken in the UKCS.

Senergy LEA also supported StatoilHydro in Norway for the introduction of HPHT-MPD to the NCS.



Underbalanced drilling technology

Although an advanced drilling technique, the earliest UBD patent can be traced back to the mid 1800s. It is safe to say it has evolved somewhat over time and through a 'growth' period in the late 1980s and 1990s, developed into a technically and commercially viable option. With improved production and overall improved ultimate recoverable reserves, UBD has found its place in the industry. It has the following additional benefits:

Benefits and advantages of UBD

- reduced formation damage – increased production
- reduced stimulation – no need to clean well up
- reservoir characterisation – improved formation evaluation, fracture identification
- minimise, remove lost circulation issues
- drilling through depleted zones
- eliminates differential sticking
- improved ROP
- improved bit life
- improved ultimate recoverable reserves

It was well documented throughout that particular 'growth' period that the biggest single risk to the well and so the reservoir, was the availability of experienced staff. Senergy LEA has extensive international UBD expertise, providing project managers, engineers and well site supervisors to the onshore and offshore UBD market. All disciplines, project managers, engineers and subsurface groups alike are complemented and supported by the industry-leading, Senergy bespoke software packages, assisting in all UBD operations.

Because we are totally independent from the service providers, and are aligned with the client, we only bring what's best for underbalanced wells.

Through tubing rotary drilling technology

The application of slimhole through tubing rotary drilling (TTRD/SSTTRD) has proven an extremely cost-effective method of accessing reserves which otherwise might have been uneconomical to develop. As the name suggests, by utilising existing wells in mature reservoirs, infill wells, stranded or

near well bore, reserves are accessed through the existing completion tubing.

Experience in TTRD wells is maturing as more wells are drilled, but they still cannot be considered routine operations, particularly in a new environment. It requires a specialist expertise, capability and knowledge of the processes and equipment to ensure operational success. Senergy LEA is the independent world authority and capability in TTRD operations. On such projects, Senergy LEA provides a central functional capability to the team, ensuring our unique experience is brought to bear. Our philosophy is to ensure that each project is given the best chance of success by providing experienced, hands-on project staff with direct TTRD experience; in this way we increase the probability of successful operations for all our clients.

The Senergy LEA experience is truly unique and was brought to bear in the delivery of the world's first Sub Sea TTRD (SSTTRD) well. This project, on behalf of Norsk Hydro, achieved a number of industry firsts from an operational perspective and in the identification and development of the slimhole technology.

Coiled tubing drilling

Coiled tubing drilling (CTD) offers many benefits not normally associated with jointed pipe operations. It is designed to work in a pressure envelope, live well environment, which in turn lends itself to underbalanced and managed pressure options. More importantly, it operates as a stand-alone drilling option; whether deployed as a concurrent or SIMOPS operation on production platform, to a bare foot facility such as a barge. Senergy LEA has in-depth worldwide experience in the project management, engineering and site supervision of offshore platform, semi-submersible and barge operations. Again, in terms of CTD, Senergy LEA has been responsible for a number of world and industry firsts. From the introduction of underbalanced coiled tubing drilling from a semi-submersible in the North Sea, where the production process facilities formed part of the drilling package, to the successful introduction of UB-CTD operations in the Cooper Basin Australia and the Deltas of Indonesia.