



Well Enhancement Services, LLC

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Getting more out of the ground

The days of mammoth oil discoveries and sprawling production sites may be fading, but that doesn't mean there aren't opportunities in the oil patch. Advances in directional drilling, underground imaging and scaling down production facilities - combined with the high crude prices that finance these innovations - are spurring the industry to squeeze more out of existing oil fields.

Stable platform

The latest generation of semi-submersible platforms and drill ships uses GPS guidance and computer-controlled thruster motors, instead of cables and anchors, to maintain a fixed position.

Drilling at depth

Floating rigs can drill in offshore depths of up to 3 km. The enormous pressures and low temperatures at these depths hamper the flow of oil and increase the risk of blowouts. Improvements in high-pressure valves and in the use of low-viscosity drilling mud are allowing oil companies to tap huge offshore oil reserves that have been unreachable until now.

Undersea wellheads

Seafloor wellheads with heavy-duty control valves and submersible pumps drive crude to the surface, where it is either processed on offshore rigs or pumped directly to offshore loading connections, where giant tankers can easily moor.

Surface sprawl

Traditionally, a separate rig was set up for each vertical well, meaning dozens of well sties might be needed to tap widely dispersed oil deposits.

Long reach

Extended-reach drilling can tap undersea reservoirs as far as 10 km from land-based drill sites.

Oil deposit

Porous rock saturated with energy-rich hydrocarbons.

Natural gas deposit

Accumulates over heavier crude oil in a typical reservoir.

A smaller footprint

Modular equipment - parts that can be carried on a flatbed truck and flexible drill sections that can be wound on a spool - translate into modern drill rigs that span as little as a quarter of the area of their predecessors. These compact production sites can be set up quicker and more cheaply, then completely disassembled once production is finished.



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Branching out

Advances in directional drilling technology mean operators can fan wells out in several directions from the main bore. In this way, one production site can access many scattered deposits or bypass environmentally sensitive areas by drilling at a safe distance.

Cap rock

Impermeable rock that traps oil and natural gas deposits.

Source rock

Crude forms here from plant and animal remains compacted at high temperatures over millions of years.

Directional drilling

Redirecting the drill usually involves sinking a retrievable diverter whose tapered whipstock nudges the flexible drill shaft along a precisely angled path.

A recent advance involves a spinning collar whose three external pads activate at the same point once each rotation, pushing against the bore hole in the exact opposite direction to the drill head's intended trajectory.

Diamond and dirt

Modern oil-drilling bits are surfaced with man-made polycrystalline diamond - less prone to fracturing than natural diamond. Mud from the drill hole is chemically treated and continuously recirculated, flushing out rock cuttings, cooling the bit and acting as a buffer against pockets of high-pressure gas encountered during drilling.