Deep Water

SOLUTION SUMMARY
Risk and Reward

Deepwater exploration and development presents some of the industry’s biggest challenges—and greatest potential rewards. This environment, defined as water depths greater than 1,000 ft (305 m) demand huge investments in capital and long-term commitment. With an extensive track record in deepwater plays worldwide, Halliburton’s experience and expertise helps our customers meet the challenging technical demands of deepwater projects while understanding – and minimizing – the associated risks.

The extent of our deepwater knowledge and experience is evident in what we have accomplished to date:

- Halliburton companies have participated in the vast majority of all producing deepwater wells
- We’ve contributed to most of the world’s deepwater completions
- Our global footprint encompasses deepwater plays around the world, from established areas in the Gulf of Mexico, Brazil and West Africa, to emerging areas of opportunity in India, Malaysia, Australia, the Eastern Mediterranean, Norway, and Eastern Canada
- Our track record of success includes development and implementation of industry-leading technologies and processes proven to help maximize ROI and help reduce operating costs in deepwater environments

Deepwater Challenges/Issues

Every deepwater development campaign presents a series of specific challenges and issues that must be systematically addressed. From the first reservoir analysis to well planning and drilling and into production of the last recoverable reserves, Halliburton is equipped to engineer the right strategies in order to maximize return on investment over the life of a deepwater project.
The Halliburton Advantage

Our experience is unparalleled. No one can match Halliburton’s proven track record of participation in some of the largest global deepwater projects ever conducted. Indeed, extensive resources and global reach give Halliburton the ability to provide a true fit-for-purpose solution, regardless of project scope. From a single tool through entire project management, we combine the right product, service and knowledgeable personnel to deliver the best solution for the job at hand.

Our leadership in real-time technologies enables multiple operations to be monitored and controlled from a central facility – an important advantage in deepwater projects where logistical challenges can be extreme. Halliburton also has a long history as an innovator in production enhancement—fracturing, stimulation and sand control—and a proven track record of applying these technologies to deepwater environments.

Deepwater Solutions

Challenge: Openhole Sidetrack in Vertical Salt Formation

A deepwater well plan originally called for drilling to 19,500 ft (5,943 m) in the 18 1/8-in. hole section with a rotary steerable system, but when unexpected changes in geology required the initial well to be plugged back, a sidetrack became necessary. Our customer expressed concern about kicking off from a cement plug in a vertical salt section using rotary steerable technology. Typically this operation is performed with a mud motor and requires an extra bit trip which drives up costs significantly.

Solution

Because Halliburton’s point-the-bit rotary steerable system requires no additional motor runs for sidetracking operations, the decision was made to proceed with the system. After running casing, the kickoff proceeded with the rotary steerable system, using at-bit MWD measurements for inclination and LWD sensors for formation evaluation measurements. The sidetrack was successfully achieved, the well was steered back to vertical and the section completed at 19,500 ft (5,943 m).

Results

Throughout the extensive directional activity in this hole section, Halliburton’s rotary steerable system performed perfectly, with no downtime or lost time incidents. The system eliminated the need for a motor run to initiate the sidetrack and associated trip time, resulting in considerable rig time savings for the customer.

Technologies Applied

Geo-Pilot® rotary steerable system
**Challenge: Stimulation and Sand Control in High Pressure Well**

An increasing number of wells in the Gulf of Mexico are being drilled to depths greater than 20,000 ft where bottomhole pressure can exceed 20,000 psi. These extreme conditions create challenges to fracture stimulation in low permeability reservoirs and sand control in higher permeability reservoirs.

A customer approached Halliburton with a challenging deepwater well requiring both stimulation and sand control. One objective was to frac a very long interval containing several zones that typically would have been treated separately. In addition to sand control treatment, the well also required stimulation to enhance the productivity of the zone. With all these parameters combined, the required surface treating pressure exceeded the 15,000 psi operating limitations of the offshore well.

**Solution**

Halliburton met this challenge by providing a proprietary weighted frac fluid and new deepwater FracPac™ system. The high density frac fluid utilized the hydrostatic pressure of the fluid column to effectively reduce surface pressure by 3,000 to 4,000 psi, which was safely within the specified operating parameters. Specialized FracPac™ assembly equipment provided essential erosion resistance required for high-rate, large-volume proppant applications.

**Results**

The well's stimulation and sand control challenges were met without complications or extra costs. These new technologies from Halliburton now make it possible to enhance productivity of ultra-deep wells using fracture stimulation, substantially improving well economics.

**Technologies Applied**

- DeepQuest™ weighted stimulation fluid system
- Beyond Red Zone™ FracPac™ system

**Conclusion: Greater Experience = Less Risk**

With technological advancements moving exploration into water depths exceeding 10,000 feet, deepwater projects must be executed with precision, while minimizing downtime and maximizing production for a balance of long- and short-term benefits. Because every aspect of the operation is critical, Halliburton’s holistic approach can cover the entire lifecycle of a project, from well planning and drilling through completion and production—including plug and abandonment. And because all levels of our organization share a focus on providing customer-directed deepwater solutions, you can count on Halliburton to deliver better performance, better service quality, and better solutions.