

Drilling & Completions Practice Impacts Customers' Bottom Lines

Drilling & Completions Optimization (DCO) is one of five high value-add practice areas offered by the Landmark Division's Asset Performance group, a global services organization with more than 4,200 consultants and project managers.

"Challenges in wellbore design are increasing every year as upstream E&P companies seek to drill deeper, extended reach wells in deepwater and high pressure/high temperature environments," says Lyle Lehman, DCO practice director. "We combine our expertise with new techniques such as geomechanical analysis, under-balanced drilling, real-time monitoring, multi-laterals and smart completions to optimize our clients' reservoir depletion strategies."

Apache's First Deepwater Project

Two years ago, Apache Corporation, one of the industry's largest independent operators, embarked on its first deepwater drilling project in the world, about 42 miles off the coast of Egypt. They needed to partner with a lead well construction consultant with proven deepwater expertise, to assist in handling all aspects of this ambitious project—from initial well design through final execution. Landmark's Asset Performance organization was chosen for the job.

Members of the DCO practice group worked side-by-side with Apache professionals in Cairo, as part of a single project team. One full-time consultant is still there today. According to Rod Roberts, DCO's coordinator for the project, Landmark consultants focused on providing Apache with a total solution covering a range of issues that went beyond traditional well design and construction. "The result," he says, "was a comprehensive solution uniquely

capable of addressing each planned well location in the field, and encompassing not only downhole issues, but also critical support requirements such as logistics, procurement and HSE."

From May 2002 through March 2003, the team drilled five wells—four gas discoveries, and one appraisal well—in the deepwater portion of Apache's West Mediterranean Concession. All five wells were extremely successful. The Al Bahig IX well, for example, was drilled to 8,050 feet in just 12

days. That was three days faster than the well plan target, and four days faster than any other well drilled in this deepwater campaign.

"Our arrangement with Asset Performance worked out exactly the way it was intended," says Mike

Harris, director of worldwide drilling for Apache. "Based on offset information available to us, we believe the Al Bahig IX was the best drilling performance in Egypt's western Mediterranean at the time. Overall cost savings to Apache, compared with the original well plan, were approximately \$1.5 million."

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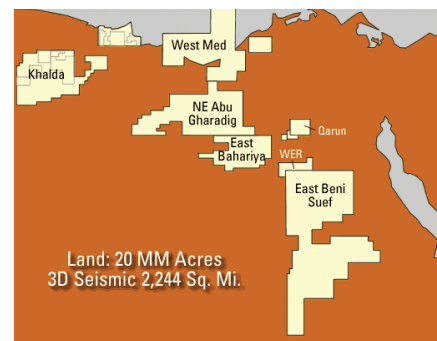
In December 2003, Apache signed a Memorandum of Understanding with Egyptian authorities for a minimum of 2.7 tcf of natural gas over a 25-year period. Soon after finalizing its agreements, Apache will start appraisal drilling on the Concession and begin infrastructure construction. Production is expected to commence in 2007, supplying approximately 400 Mmcf of gas per day to the Egyptian market for the first five years.

DCO Delivers Results

The Drilling & Completions Optimization group has delivered substantial results on projects all around the world. For an operator in Venezuela, for example, the team identified \$25 million in cost savings. In Indonesia, DCO reduced the required days-to-TD for four consecutive years in one onshore project. While drilling 17 wells for a Rocky Mountain operator, consultants reduced drilling days by 28 percent and well costs by 12 percent.



Egypt is one of Apache Corporation's core operating areas. During the company's first deepwater project in the world, members of Asset Performance's DCO team worked side-by-side with Apache professionals in Cairo. Photo courtesy of Apache.



Apache has substantial acreage in Egypt, including the West Mediterranean Concession where five successful deepwater wells were drilled from May 2002 through March 2003. Map courtesy of Apache.