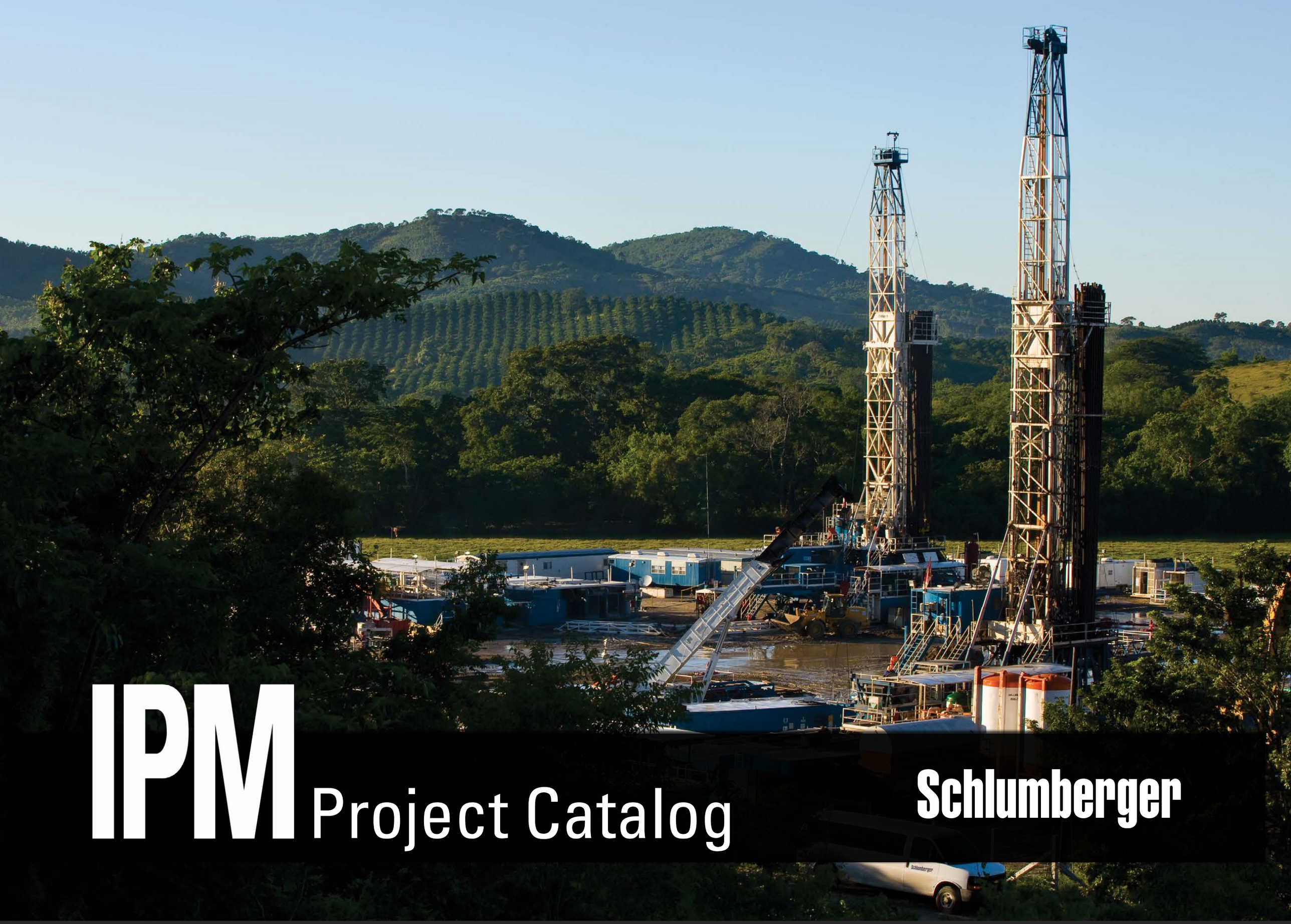


IPM Project Catalog

Schlumberger

Our valued clients,

Since the inception of Schlumberger IPM in July 1995, we have come a long way. Today, we deliver project management for clients worldwide, including major operators, resource holders, and independent clients. We deploy the best technologies Schlumberger has to offer to manage drilling risk and accelerate and maximize production—always striving to deliver on budget and on time.

The talent, diligence, and professionalism of IPM employees and our focus on HSE and execution excellence in the delivery of our projects has allowed us not only to gain the trust of our clients, but also to grow at a phenomenal rate.

This catalog is a brief summary of some of the projects we have delivered in different environments. It will give you an idea of the challenges that we face, how we solve them, and the results we achieve.

We hope that you will enjoy this catalog and we look forward to supporting you in the years to come.

Carl Trowell

IPM President, Schlumberger

Click on a link to go to an IPM project

SCOPE>>

DELIVERING SOLUTIONS>>

ALL PROJECTS>>

WCI	Well Construction and Intervention
WPI	Well Production and Intervention
RMG	Rig Management
IS	Integrated Services

IPM Scope

IPM Activities

- Asset management
- Field development
- Field redevelopment
- Well construction and intervention
- Well intervention
- Production enhancement
- Integrated services
- Rig management

Integrated Services

- Average number of projects per year: 60
- Mainly deepwater activity

Well Construction and Intervention

- Average number of wells drilled per year: 535
- Average footage drilled per year: 4.1 million
- More than 65 active drillstrings

Well Production and Intervention

- Workover, completions, plug and abandonment (P&A), and managed services on deepwater intervention vessels
- Average number of well workovers per year: 1,250
- More than 35 active intervention rigs

Rig Management

- An average of 125 rigs, many working for IPM projects

Delivering complex oil and gas project solutions to oilfield operators

The Schlumberger Integrated Project Management (IPM) group delivers complex project solutions to oilfield operators on an outsourced or collaborative basis. We specialize in delivering complete projects primarily using Schlumberger oilfield services and products, complemented by third-party services where needed and as agreed with our clients.

Schlumberger global expertise and industry-leading standards, technologies, processes, and systems, coupled with IPM local knowledge and infrastructure investment, enables our highly skilled and trained personnel to deliver IPM projects, on budget, on time, and to the highest safety standards.

The IPM offering includes integrated services, well construction and intervention services, well production and intervention, and rig management, and acts as enabler for the wider Schlumberger organization to become involved, as contractor, in our clients' and partners' projects.

Our business offering is unique and tailored to the needs of each project. Accordingly, IPM has a commercial flexibility that allows us to design a remuneration scheme that matches the objectives of the project and aligns Schlumberger with the goals of our client and the project owner.

Integrated Services

An IPM Integrated Services (IS) contract delivers managed Schlumberger and third-party services and products, and includes an IPM-trained Integrated Services Project Manager (ISPM). The ISPM is the focal point of contact between the project owner and the various Schlumberger services, ensuring that project objectives are aligned with IPM principles.

Well Construction and Intervention

The IPM well construction and intervention service encompasses the entire scope of services necessary in constructing or changing the architecture (re-entry) of wells. This service covers all aspects of well planning, well drilling, engineering, supervision, logistics, procurement and contracting of third parties, and drilling rig management.

Well Production and Intervention

The IPM well production and intervention service includes the entire project scope necessary to abandon, maintain, or increase the production of single or multiple wells. All aspects of project planning, well engineering, wellsite supervision, civil engineering, logistics, procurement, contracting of third parties, and workover rig contracting and management are incorporated into the service scope.

Rig Management Group

Our rig management service provides specialist rig management to IPM projects and oil and gas operators worldwide, with approximately 125 rigs.

Algeria

Sahara Well Construction Services
Well Construction and Intervention–Rig Management
Joint Venture

Key facts

- A threefold increase of the ROP on bottom thanks to implementation of the ROPO* rate of penetration optimization software
- Field record achieved with TD reached in 38 days against 52 days planned

Active project

Challenge

In the late 2000s, the Algerian government had signed several gas supply contracts with foreign countries for delivery from 2010 onwards, prompting the country to appraise and develop gas reservoirs. Realizing that this increase in activity would require the mobilization of not only 13 additional rigs, but also of an engineering and project management workforce not available in Algeria, the client opted for an Integrated Project Management model. Encouraging cooperation between affiliates specializing in rig management led to the creation of a joint venture between Schlumberger and Enafor, a leading drilling contractor in Algeria.

The top four sections of the wells were delivered on a lump-sum basis while the reservoir section was charged on a daily rate, with the client providing all services.

Solution

Sahara WCS is an Algerian-based company specializing in the provision of well construction and intervention projects. It currently holds and operates a fleet of five drilling rigs. Sahara WCS is a fully independent organization with its own support functions and a staff count of close to 500, made up of personnel either employed directly or seconded from two mother companies.

The startup of the project required intensive preparation with the importation and startup of five 1,500-HP rigs, the setup of the project team, and the preparation of remote operations.

Results

The project prompted a steep learning curve, leading to

- an average lump-sum time of 29.2 days in the last wells drilled, compared to the 47.5-day average achieved in the first drilling campaign and the 33-day objective given by the client
- a reduction of the rig NPT down to 1.3% (beginning of 2012) after the first year of operations.

Algeria

Well Construction Intervention: Drilling Optimization

Key facts

- Three-rig well construction project
- Project colocated in client operations office
- 30 Integrated Project Management (IPM) employees and 240 field personnel

Challenge

Algeria, a member of OPEC (Organization of Petroleum Exporting Countries), had set itself an intensive target of raising production from 1.4 million bbl oil/day to 2 million bbl oil/day by 2010.
The national oil company had been asked to manage the achievement of this challenging target, which was to be reached through acceleration of new developments, as well as redevelopment of existing assets. Under the new Algerian Hydrocarbon Law, introduced in 2006, the company was to hold a majority stake in all new licenses. These two factors created a hugely increased workload in an environment that was already severely short of expertise.

Solution

In 2006, the client engaged IPM under an incentivized well construction contract to help handle the overall workload and improve drilling efficiency in Algeria's largest producing field (around 450,000 bbl oil/day). The IPM incentives scheme is based

upon the total time taken to move, drill, and complete a well, and activates as soon as we exceed the client average by 6%. Schlumberger was assigned a well construction and intervention drilling optimization project centered around three drilling rigs, with responsibility for well engineering, logistics management, operations management, and wellsite supervision. Schlumberger also had preferential rights to provide services on the assigned rigs, under pre-existing agreements, for the drilling phases of the wells.

The project team was colocated in the client's drilling operations office, working directly with the client's operations personnel, and reporting to the client's project manager. The project team consisted of a combination of experienced and junior IPM personnel, as well as some junior client drilling engineers seconded to the project for training and coaching purposes (a key part of the client's knowledge transfer and training objectives). The project was chosen to be the field test location for the development and use of operations support center technology to improve performance in remote projects. The operations support center was located in the UK IPM headquarters and provided 24/7 monitoring and support to the project team.

Results

From September 2006, the project was active on three rigs. Key achievements of the project include the following:

- The project team drilled one of the fastest wells in the field, reaching target depth 10 days ahead of target.
- Based on project performance, Schlumberger was invited to take over a similar scope of work in Algeria's Gassi Touil area.

Australia

Rig Management–Well Construction and Intervention:
Saxon Energy

Key facts

- Integrated Project Management (IPM) commissioning, start-up, and operation of nine Saxon Energy rigs
- IPM integrates a multidisciplinary team providing a variety of services
- The team has completed wells in as little as 1.58 days
- Currently more than 330 wells have been completed
- Drilling performance improved from an initial four to six days per well to 2.31 days, including rig move time
- 104 wells with a total of 77,142 m drilled thus far

QGC, a BG Group business, is a leading Australian company exploring and producing unconventional coal seam gas resources in Queensland, with operations covering an area the size of the UK. QGC is the front runner in the Queensland Curtis LNG (QCLNG) project, which is the world's first project to turn coal seam gas into liquefied natural gas.

Challenge

With the unconventional coal seam gas industry in eastern Australia rapidly expanding, IPM was contracted to manage, on behalf of QGC, the commissioning, start-up, and operation of nine Saxon Energy rigs in Queensland, Australia. This involved the drilling and completion of over 1,000 wells, requiring many different services.

Solution

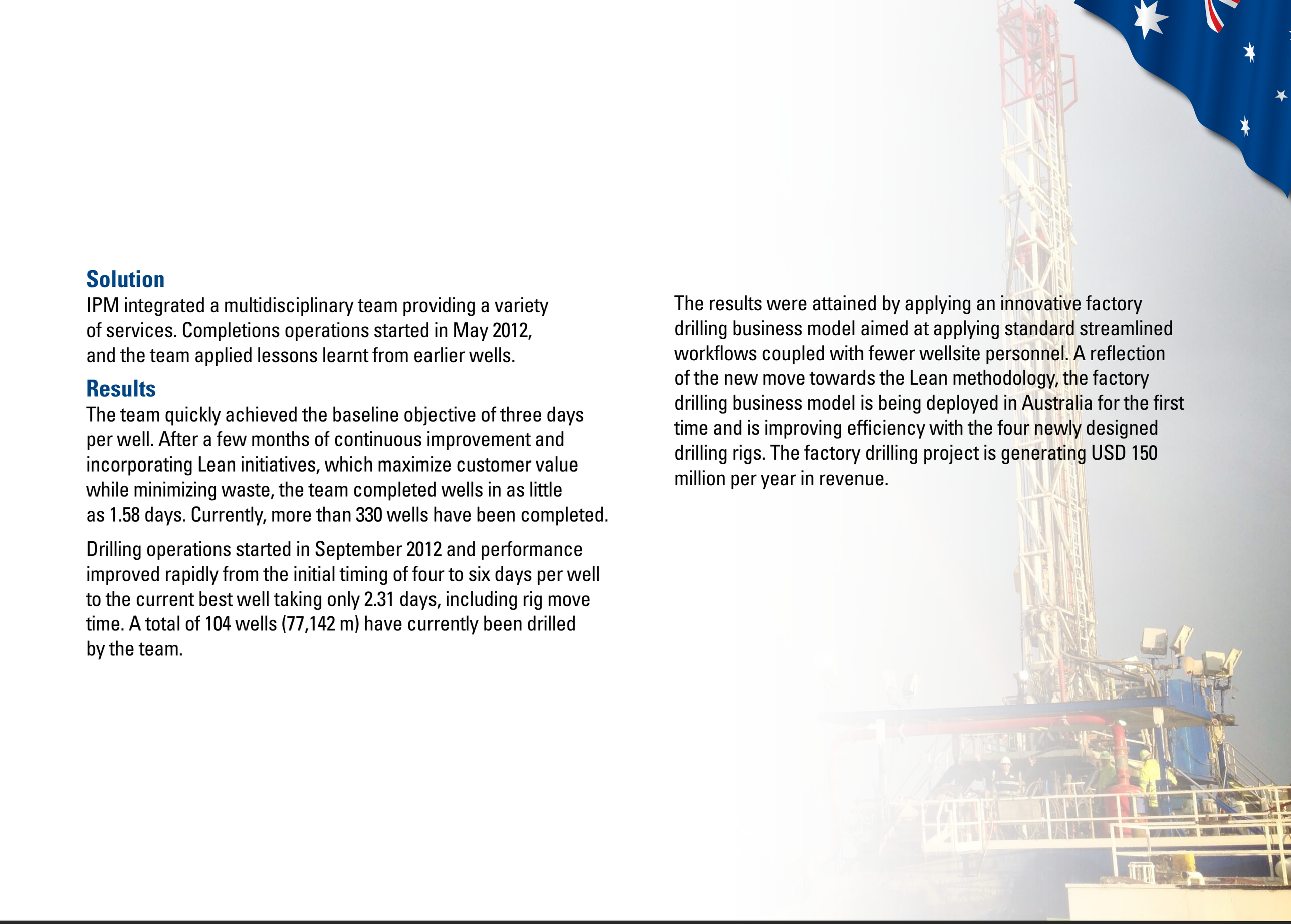
IPM integrated a multidisciplinary team providing a variety of services. Completions operations started in May 2012, and the team applied lessons learnt from earlier wells.

Results

The team quickly achieved the baseline objective of three days per well. After a few months of continuous improvement and incorporating Lean initiatives, which maximize customer value while minimizing waste, the team completed wells in as little as 1.58 days. Currently, more than 330 wells have been completed.

Drilling operations started in September 2012 and performance improved rapidly from the initial timing of four to six days per well to the current best well taking only 2.31 days, including rig move time. A total of 104 wells (77,142 m) have currently been drilled by the team.

The results were attained by applying an innovative factory drilling business model aimed at applying standard streamlined workflows coupled with fewer wellsite personnel. A reflection of the new move towards the Lean methodology, the factory drilling business model is being deployed in Australia for the first time and is improving efficiency with the four newly designed drilling rigs. The factory drilling project is generating USD 150 million per year in revenue.



Brazil

Well Production and Intervention: Water Treatment

Key facts

- Offshore crew: 75
- Fluid capacity: 27,000 m^3/d
- BS&W (basic sediment and water): < 1.0%
- Produced water–oil content: < 20 ppm
- Seven accident-free years

Challenge

During the late 1990s, a Brazilian client intended to improve the crude oil quality of liquids produced and exported from facilities in the southern area of one of the basins offshore Brazil.
The project objective was to reduce the water volume exported to an onshore terminal to 1.0% or less. Because of the existing equipment's limitations, the improvement in crude oil quality had to be achieved on a separate facility.

Solution

In early 1999, Schlumberger instigated a field management and production (FMP) project to convert a semisubmersible into a floating dewatering facility by installing a new processing plant. Schlumberger also began a 10-year life-enhancement upgrade with the associated utilities and support systems required to treat the crude oil and water mixture to meet both the acceptable export crude oil quality and produced water quality levels for overboard disposal. A long-term operating contract was signed, which included the conversion of the semisubmersible.

Results

The new dewatering plant was completed with the capacity to handle a maximum 27,000 m^3/day of crude oil and produced water mixture with a water cut of 65% over the expected period of operation.

The main objectives of the dewatering facilities were as follows:

- To separate produced water from the crude oil, to give a BS&W of less than 1.0%.
- To export the crude oil stream directly to main offshore production facilities via 8-in and 10-in diameter flowlines.
- The separated produced water is treated to give an oil content of less than 20 ppm and a maximum temperature of 40 degC to permit overboard disposal.

Brazil

Well Construction and Intervention: Land Project

Challenge

A Brazilian independent oil and gas (O&G) operator was participating in a joint venture with its sister company and another Brazilian O&G independent. The initial challenge was to explore a remote field for gas reserves. If the campaign was successful, the sister company intended to invest in a thermoeletric power plant in the region.

The objective was to confirm reserves and, in a short time, implement a field development plan that would tie in with the near-future demand for additional energy in the region.

Solutions

Schlumberger was selected as partner to provide integrated services coordination. The exploration campaign began with one 1,500-hp drilling rig.

Field data communication and remote operations surveillance was also provided by Schlumberger from the client's main office, 3,000 km from the field.

The integration of Schlumberger and third-party (TP) services in a remote location was aided by the creation of a Schlumberger logistics hub to improve logistics management and reduce associated costs.

Pathfinder, Smith, Schlumberger, and M-I SWACO improved project performance by providing solutions to challenges such as low ROP, cement isolation, directional control, environmental impact, and formation damage.

Results

The first exploration well was spud in August 2010. In March 2011, the client added a second exploration rig. The drilling campaign quickly developed into a field development campaign with a third drilling rig added in March 2012.

In less than two years from the spud of the first well, the operation's production wells were drilled, completed, tied in to surface equipment, and ready to produce.

Operations continued uninterrupted and had low NPT. In fact, NPT relating to Schlumberger performance was less than 2%.

The operation's total well cost was reduced by 40% and the completion design was customized to project needs in preparation for the client's first producing well, which was ready in January 2012 (four months earlier than planned).

Key facts

- Fast and customized solutions to client's needs
- Well cost reduced by 40%
- Outstanding well design optimization
- Excellent QHSE performance

Brazil

Well Construction and Intervention: Offshore Project

Challenge

A Brazilian independent oil and gas (O&G) operator had an intensive offshore exploration campaign objective to increase project assets from one to five semisubmersible rigs within six months.

Solution

Schlumberger Integrated Project Management (IPM) was selected as partner to provide integrated services for five semisubmersible rigs, including remote operations surveillance in real time from the client's offices.

A formation sampling methodology was implemented to select the best MDT* modular formation dynamics tester fluid sampling probe and to reduce fluid sampling time while improving the purity of the sample taken.

The Lean methodology was applied at several levels to improve engineering and well design, logistics and operations planning and execution, resource optimization, and cost reduction. This resulted in an optimized design time saving of 25%, a rate of penetration (ROP) improvement of more than 30%, and flawless execution of the two latest horizontal wells, among others.

The WellTRAK* well tracking and knowledge system was implemented as the project software for daily operations reporting, with special features incorporated for the offshore operation (National Petroleum Agency reports, project archiving feature, etc.)

An acid diversion system (ADS) was designed for completion and stimulation operations which were executed with the stimulation vessel equipment also customized for project needs (1,100 to 2,000 bbls acid capacity upgrade).

Results

The operation spud as per plan in September 2009, and a full fleet was in operation at the end of February 2010. A total of 50 wells have been drilled and 36 intervals have been tested after two years of operations with a record NPT of less than 12% (Schlumberger NPT was under 2%) and zero lost time incidents (LTI).

First oil, produced from the first horizontal well drilled by Schlumberger, was officially announced on January 31, 2012.

Key facts

- Customized solution for an O&G startup company
- Schlumberger NPT less than 2%
- Advanced technology solutions
- Real-time remote solutions

Brunei

Well Production and Intervention–Rig Management Project:
Bima Multipurpose Service Vessel

The Bima is a custom-built, self-propelling, offshore multipurpose service vessel (MPSV) constructed for the Asian environment in 1999. It is designed for water depths of up to 49 m. Since its construction, the vessel has worked for a range of clients in Asia, and for several years in Brunei, before having moved on to various Saudi operations.

During its time in Brunei, the Bima vessel achieved five accident-free years of operation.

Summary

The Bima vessel is a one-stop shop for Schlumberger operations.

Key facts

- Self-propelled shallow water jackup
- Logging, cementing, and directional drilling services operated from control room
- Five accident-free years

Canada

Well Production Intervention: Gas Hydrates

Challenge

Located in a remote island in northwest Canada is one of the most concentrated gas hydrate reservoirs in the world. Below the surface are nearly 4 trillion cubic feet of natural gas hydrate and methane, frozen in an ice-like state, under 600 m of permafrost.

At the time of this project, gas hydrates had yet to be produced though they are an important source of energy, particularly for countries without conventional oil and gas. With this in mind, the client governments embarked on a 10-year gas hydrate research and development program to evaluate the basin and its gas hydrates. The ultimate objective was to flow a gas hydrate well by lowering the hydrostatic pressure.

Solution

Schlumberger was contracted to provide a complete IPM well construction package comprising project planning, engineering, drilling, completions, and testing, including field supervision of all activities, third parties, and civil activities. All Schlumberger services were provided through a joint-venture company consisting of Schlumberger Canada Ltd and the investment arm of the local aboriginal group.

The program, which was undertaken over two winters (2006/07 and 2007/08), took place in the Northwest Territories of Canada.

Results

Six continuous days of gas hydrate flow testing (a world first) successfully concluded the site's 10-year gas hydrate research and development campaign by the client governments.

Key achievements:

- 1,300 m drilled, cased, and completed with five external monitoring cables and sensors supplied by Schlumberger SKK (Japan)
- A short-duration production test was conducted in April 2007, using artificial lift downhole gas/water separation technology
- Pre-gas and post-gas hydrate dissociation cased hole logs were run by Schlumberger wireline services
- A complex completion was run, including MeshRite* stainless-steel screens and packers supplied by Schlumberger completions services, memory gauges from testing services, a Poseidon pump, along with Phoenix* artificial lift downhole monitoring systems, and a third-party downhole induction heater
- Gas volumes were measured using the PhaseTester* portable multiphase well testing equipment
- The formation was successfully tested under three different bottomhole pumping pressure conditions
- Real-time data transmission through the InterACT* connectivity, collaboration, and information system allowed the client R&D team to monitor the test from their operation center
- Following the test, the ESP, heater, and memory gauges were all recovered, and both wells abandoned

Chad

Well Construction and Intervention–Well Production and Intervention: Arresting Production Decline

Key facts

- The first four new wells were completed ahead of plan (11.8% on average)
- The rig-based workovers were approximately 15% ahead of plan

Active project

Challenge

Oil has been produced from fields in the southern part of Chad since 2003. Production of high viscosity oil comes from unconsolidated sandstones separated by reactive shales, pumped using a mix of electrical submersible pumps (ESPs) and progressive cavity pumps (PCPs). An already technically challenging operation was further complicated by the logistics issues of a remote landlocked country, with very little developed infrastructure.

Schlumberger has been involved in this project since late 2000, when field development began, and has provided logging, cementing, gravel pack, and other services for all the 800-plus wells drilled to date, as well as supporting the intensive workover and stimulation program required to maintain production.

By 2010, the operator faced declining production and increased costs that threatened to make further infill drilling uneconomical. The operator began to consider outsourcing options to reduce cost, without compromising on speed and efficiency. The primary driver was to extend field life and improve ultimate reserves recovery from the field.

Solution

In January 2012, after a negotiated tender process, Schlumberger took over operational management of all the operator's drilling, workover, and rigless intervention operations in the country. This currently includes activities on two drilling and two workover rigs, as well as managing the central drilling camp including catering, lodging, maintenance, security, pipe yard, and warehousing.
We expect to drill over 200 wells and perform in excess of 600 workovers during the initial three years of the contract period.

All activities were priced on a lump-sum basis. IPM provided overall project management, well engineering (drilling and completions) and wellsite supervision on all the rigs, enabling the client to release its own drilling and operational resources for use elsewhere.

Results

As of the end of 2012, the project team had delivered over 50 wells and completed more than 160 workover jobs.

Colombia

Casabe Field Redevelopment

Challenge

The 60-year-old Casabe field is located in Colombia, near the river basin of the Magdalena Valley. The field was discovered in 1941 by Shell Colombia and the first well drilled was Well CSBE-001. Commercial production began in June 1945, and full development was achieved in 1958 with 448 wells.

The field has been supported by water injection for the last 20 years and there are approximately 500 injector wells.

Casabe is a very stratified reservoir with 26 sands identified that are grouped into levels of detail. The structure is an asymmetrical anticline with a moderate dip to the east, affected by transpressional faults both in the Cretaceous and the Paleocene. These transpressional faults produce both normal and reverse faults defining the operational blocks of the field.

Solution

An IPM and field management plan (FMP) alliance contract was signed between Ecopetrol and Schlumberger in April 2004, with the aim of increasing production, adding reserves, improving reservoir management practices, introducing new technologies and processes, and reducing operating costs.

The scope of the program has evolved from a field redevelopment plan to drilling and workover programs, water injection, and daily operations.

Results

The projects started in 2004. A field redevelopment plan was developed, presented, and approved by the alliance. Among other things, the plan consisted of a drilling program, a workover program, and an intensive water injection program.

Drilling started in 2004. Since then, 46 producing and 21 injection wells have been drilled. Selective injection has been implemented using waterflood regulator technology with 15 new wells and three conversions of existing injectors.

Production has passed 10,200 bbl/day—a significant increase on the base production of ~4,000 bbl oil/day. The total field water injection has increased by more than 50%. Wells subjected to the new water injection method have had significant increases in oil production, thus validating the new approach.

Key achievements

- Field development plan constructed, presented, and approved
- 46 wells drilled
- 21 producers drilled
- 15 selective water injectors and three conversion wells implemented to date
- Production >10,000 bbl oil/d; more than twice the base production
- Water injection >50% increase

Denmark

Integrated Services: North Sea

Key facts

- Significantly complex project
- No previous exploration experience in North Sea area
- Lack of footprint in a suspected dry location

Challenge

The Danish Energy Agency intended to explore two prospects, located in the North Sea, in cooperation with their partners. Requiring equipment, technologies, and services critical to such an operation, and being newcomers to North Sea exploration, the operator chose to request the assistance of Integrated Project Management (IPM).

The North Sea is a complex and challenging exploration environment for even the most experienced operator. However, being first-timers in the region was only the operator's first challenge, the second being the generally held belief that the targets had low prospectivity.

The mission was to drill and evaluate both prospects in the most efficient and safe manner. This would entail a project of significant complexity. The operator recognized the need for process simplification, overheads reduction, efficiency enhancement, and comprehensive contingency planning, whilst achieving their objectives with minimal operational personnel. IPM implemented an Integrated Services (IS) approach which would address the challenges of the project.

Solution

An Integrated Services Project Manager (ISPM) was allocated to plan, coordinate, and enhance processes by integrating all the services and technology the project would require. These included drilling reservoir evaluation, well testing services, engineering and operational support, logistics, and third-party management.

The unified Schlumberger drilling portfolio provided seamless integrated services from Smith Bits, M-I SWACO drilling fluids, Geoservices mud logging, and Schlumberger directional and measurement-while-drilling services. This provided 360-degree vision over the drilling operation, allowing real-time exchange of information and ideas that optimized drilling parameters.

Consequently, an integrated operation with a single interface for all services, people, products, and administrative procedures simplified work processes while maintaining and exceeding quality and safety requirements. Schlumberger also exceeded client expectations by delivering high downhole tool reliability.

Results

The first exploration well was drilled on one of the prospects and discovered hydrocarbon in the primary Middle Jurassic target. The discovered hydrocarbon was high quality gas with condensate of approximately 44° API gravity at a ratio of approximately 80 to 90 barrels of condensate per million standard cubic feet of gas.
A second well was drilled on the second prospect. This well also encountered hydrocarbon pay in an overall Miocene sandstone, at the extraordinarily shallow depth of 930 m below mean sea level. This discovery is confirmed as a light oil of 34 to 35° API gravity.

The Danish Energy Agency is very pleased with these results, and the client's partners expressed their satisfaction at the outcome of the program. Having established itself as a successful and viable operator in North Sea operations, the client is consequently satisfied with Schlumberger performance and will not hesitate to use IPM IS provision in future projects.

India

Integrated Services: Deep Water

Key facts

- Four-year, 24-well deepwater exploration campaign
- Client's first Integrated Project Management (IPM) project
- Full IPM project team, divided between two key locations
- IPM mobilized all services and materials in less than 14 days
- As of the first 13 wells drilled, the project was 19 days ahead of plan
- Total spend well below AFE (Authorization for Expenditure) plan

Challenge

A national oil and gas company wanted to embark on a four-year, 24-well campaign of deepwater exploration drilling, and improve its drilling performance and technology.

Drilling would be conducted broadly in the major offshore basins of India and the surrounding territories, from the Andaman Islands to the west coast of India. The large distances between these locations represented a significant logistics challenge.

A new deepwater drillship was contracted and the client decided for the first time to award an Integrated Project Management (IPM) contract to a single company to provide all other services. The scope included everything from exploration well services and coring to long-range helicopter support and shore base, as well as the key tangibles, subsea well heads, engineering, and wellsite supervision.

As required by law, the work was competitively tendered based on stringent technical qualification criteria. By the time the client released the tender, the drillship had mobilized and time was in short supply. The winning bidder would have to be ready to mobilize all services for the first well within 30 days following the award to avoid costly rig standby.

Solution

Schlumberger IPM took the challenge and submitted a very thoroughly researched bid in cooperation with key suppliers. This care in preparation paid off, and Schlumberger was awarded the contract. IPM deployed a full project team divided between two key locations. The team was set up to handle all services coordination, QHSE, logistics, and third-party procurement. IPM subcontracted a specialist engineering firm with extensive deep-water and subsea experience and a proven track record in India, which became an integrated part of the project management team.

A special long-range helicopter was contracted to reach the most remote locations, and all tangibles and long lead items were secured from suppliers in advance to ensure they were ready on time.

Results

IPM succeeded in mobilizing all services and materials in 14 days—less than half the time specified by the client. There was ample time for a smooth and orderly project launch and the client suffered no rig standby.

Within the first two years 13 out of 24 wells have been successfully drilled. Despite the extreme distances, logistics have been exceptionally well managed—impressively, there were zero delays to the rig from equipment logistics or any critical services.

Drilling performance has steadily improved and project NPT has fallen each year, with no catastrophic events recorded. The total spend to date is well below the total AFE plan. As of the first 13 wells drilled, the project was 19 days ahead of plan.

With its unwavering focus on QHSE and effective contractor management, IPM has achieved two years at the shore base location without a single LTI.

Project performance has exceeded client expectations, with senior management remarking that IPM had provided “excellent offshore facilitation to cater for east coast deepwater operations.”

India

Well Construction and Intervention: Shale Gas

Key facts

- Client exploration and appraisal of shale gas potential in India
- No in-country oil and gas infrastructure
- No regulatory framework in place
- IPM to plan, engineer, and execute four-well drilling, coring, frac, and testing program
- Wells drilled, and tested on schedule and under budget

Challenge

In 2007, as the shale gas revolution was gaining momentum in North America, an Indian NOC client was considering how it might begin to explore and appraise the shale gas potential of its country. It chose to evaluate a remote basin in the Damodar valley. The area had no oil and gas infrastructure and significant security and community-relations issues. As no shale gas regulatory framework was then in place in India, the permits, importation of specialized equipment, and contractual policy all had to be managed and resolved for the first time. As a result, a great deal of flexibility had to be planned into the program.

Solution

In 2009, the operator selected Integrated Project Management (IPM) to provide shale gas expertise from Schlumberger petrotechnical services and its TerraTek* rock mechanics and core analysis services to define the data collection program and evaluate the data and core samples during drilling. A four-well drilling, coring, frac, and testing program was conceived and handed to IPM to plan, engineer, and execute.

IPM fielded a full project management team including experienced well construction engineers and supervisors, procurement, logistics, QHSE, and community relations specialists. IPM acted as general contractor hiring the drilling rig, transport, and logistics services as well as providing the full suite of Schlumberger well services.

Over 150 import transactions and 400 shipments were managed from ports and supply locations to the field. IPM provided training, support, and HSE and service quality coaching to the Indian drilling rig contractor and local service providers. IPM also instigated a journey management program for the movement of all people, supplies, and equipment.

IPM brought in specialist security consultants and put in place measures to protect the well sites. More importantly, IPM took the initiative of providing outreach to the community by purchasing required goods and services locally and offering benefits such as medical clinics.

Results

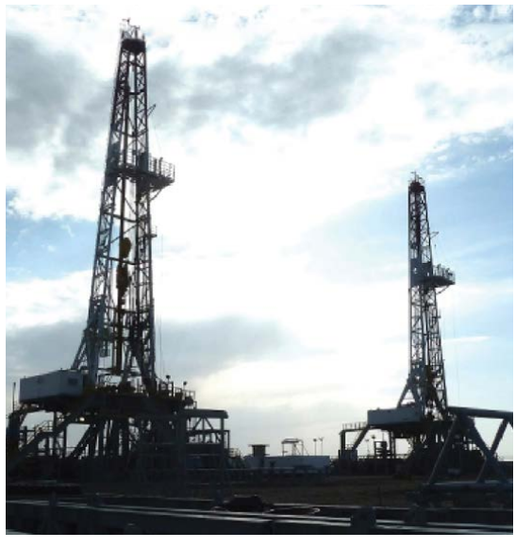
Project performance was excellent. Wells were drilled and tested on schedule and under budget. Even more impressively, IPM completed this difficult project with zero lost time incidents (LTIs). There were no security incidents, and the local community responded very positively to the outreach initiatives.

IPM supervision and continuous implementation of learning processes improved drilling performance with each new well, bringing the NPT down to 1.5% on the last well.

The first well was tested and flowed shale gas to the surface. The client considered the exploration and appraisal campaign a success, and all evaluation objectives were met. The government of India is now moving forward with plans for shale gas licensing rounds in the near future.

Iraq

Well Construction and Intervention: Field Development



Key facts

- 95+ wells drilled to date with 40% performance improvement compared to other service companies operating in the field
- Projects delivered three months ahead of schedule, bringing wells to production earlier

Active project

Challenge

In 2009, the Iraq Federal Oil Ministry held two largely successful petroleum license rounds to drive the country's production growth. These led to the award of technical services contracts for some of the country's largest producing and undeveloped assets. Between 2010 and 2020, the forecast is for a nearly three-fold increase in Iraqi oil production. However, a significant need for capital infusion and logistical complexities could hinder production increase.

To achieve the intensive production targets set, all participants in the license rounds needed to reduce the number of tenders they issued, while increasing the scope of work of these tenders by relying on the oilfield service providers to manage the well construction part of the chain. This not only reduced the number of suppliers but also passed a considerable part of the risk to the service providers.

Solution

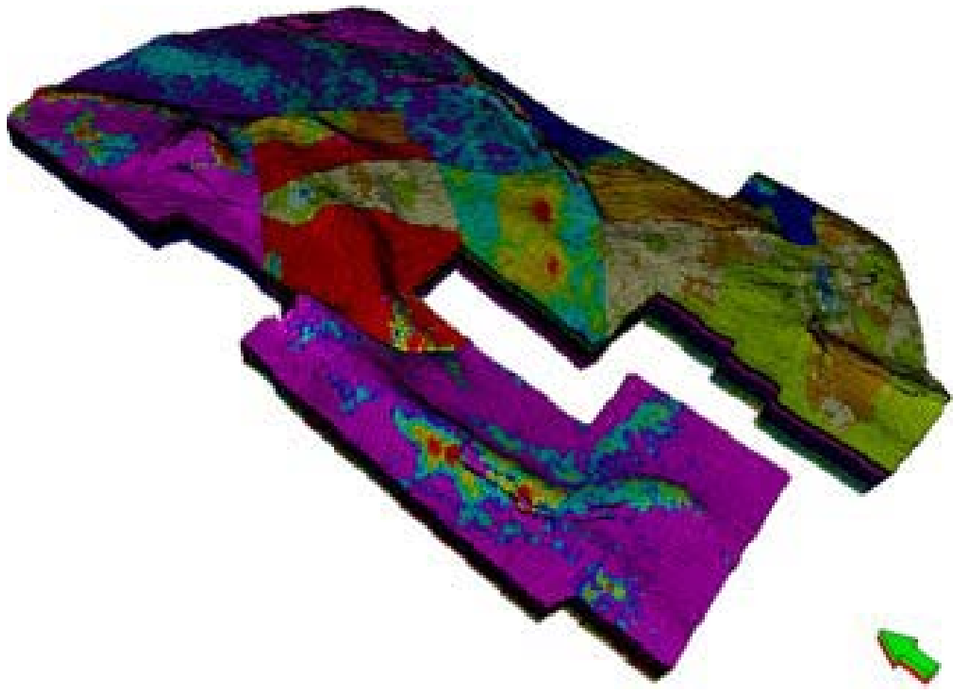
Since 2010, Schlumberger Integrated Project Management (IPM) embarked on multiple well construction and intervention projects whereby wells were being drilled, completed, and delivered ready for production to the customer on a turnkey basis. The projects involved mobilization and management of drilling rigs, drilling services execution and management, as well as third-party management including, in some cases, civil work construction and security services.

Results

A total of 65 wells were completed and delivered to customers in Iraq between 2011 and 2012 on a turnkey basis. Field drilling records in every project and a total of 70% reduction in drilling times were achieved from early 2010.

Kuwait

Integrated Services–Well Production and Intervention:
Tight Sour Gas



Active project

Challenge

The strategic challenge was to expedite and fast-track the development of Jurassic age natural gas resources to meet the growing demands of the Kuwait natural gas and power sectors.

While Kuwait is a country rich in oil reserves, its 1.2 Bcf/day production in associated gas is well below the domestic market requirements. To make up the energy deficit, Kuwait was consuming approximately 130 KBO PD, representing a direct and real energy cost of >USD 150 million per month. There was enormous pressure within the country to fast-track a fully optimized gas development.

Solution

The Schlumberger and client team developed a list of innovative technologies to cut well costs, enhance production rates per well, and collect reliable data intended to reduce risk and uncertainty for the third phase of the operation.

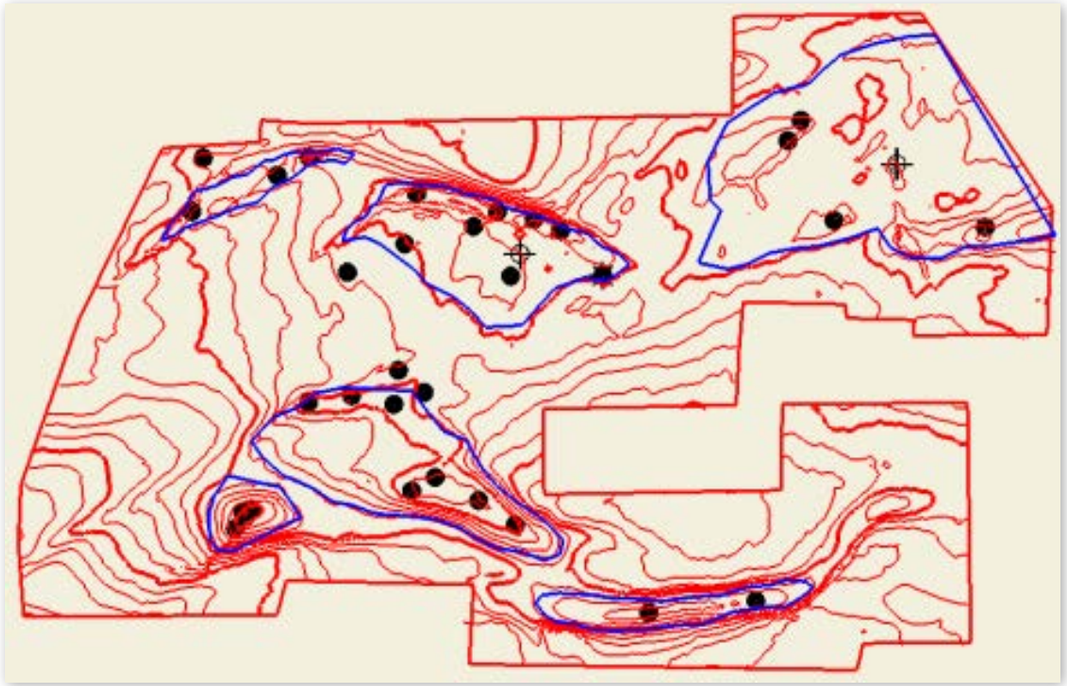
The project was a new business model for Schlumberger and client—the first occurrence, in the Middle East, of a national oil company partnering with a service company to develop a new field of major strategic importance.

The project team consisted of members from the client company and Schlumberger working together in the client office for the duration of the project. The product of this multidisciplinary effort was the field development plan (FDP), which was owned jointly by Schlumberger and the client.

Results

The first phase of development was completed and resulted in substantial oil and gas revenues for the client.

The innovative efforts of the team enabled delivery of the FDP, and boosted confidence in making timely decisions. Without the teamwork, innovations, and trust of the client, decisions would have been delayed. The FDP generated a strong technical case supporting the decision to implement Phase II of the development—a decision that would require a USD 8 to 9 billion investment by the client. Phase II was predicted to produce sufficient gas to replace 100,000 stb/day of liquid hydrocarbons currently used for electricity generation in Kuwait. The FDP also demonstrated viable and significant opportunities for optimization that would result in increased recovery or savings of multiple USD billions in costs while still meeting the strategic production targets. An additional positive impact of the FDP was achieved through its recommended changes to drilling and completion techniques, offering further opportunity to create value for the client.



Libya

Well Construction and Intervention:
Rising to the Challenge

Challenge

Late in 2007, a Benghazi-based operator was on the verge of the largest drilling operation ramp-up in its history—an undertaking that would take it from four to 16 drilling rigs in less than seven months.

The task came with many challenges including a shortage of resources, a challenging time frame, new rigs, and a need for efficient well delivery within budget and on time.

Solution

The engagement began with a study of how to optimize drilling operations in one of Libya's promising new fields. After conducting a two-month study of the field and producing a comprehensive proposal highlighting the technologies and expertise that Schlumberger Integrated Project Management (IPM) could introduce, Schlumberger signed an agreement with the client for the well construction and management of three drilling rigs—the first agreement of this nature in Libya.

The planning and execution of the start-up of this project, in a frontier area that was new to both IPM and the country's oilfield services organization, presented a challenge for Schlumberger. Benghazi, on the eastern-most side of Libya,

would require the set-up an entire operational team with the required infrastructure and the safe relocation of 23 employees, including five permanent expatriate families.

This process represented a steep learning curve for both the segment and OFS support structure.

Today, Benghazi is a great example of Schlumberger commitment to the oil and gas business in eastern Libya—a commitment which dates back to 1956. In 2007, Benghazi was home to only seven Schlumberger employees and families. In only two years, this had grown to more than 70 employees and families, representing all segments of the company, working in newly refurbished offices, and living in a residential compound. This number includes six Libyan well engineers who were recruited, developed, and trained by IPM locally, demonstrating our determination to increase Libyan personnel training and development.

IPM Libya has managed and operated six rigs in numerous fields across Libya, delivering many wells using expertise that has been acquired from operations around the world. The project produced relationships with more than 55 rig contractors, local suppliers, and service providers, and built a wealth of in-country knowledge that separates IPM from any competitor. Health, safety, and environmental (HSE) considerations are key priorities. We have a proactive approach to training and monitoring rig contractors on a continuous basis, as we strictly adhere to the Schlumberger HSE standards in a relatively immature environment.

The project team actively introduced technologies that were new to the client, such as bottomhole assembly designs, drilling fluid selection, and innovative well designs and processes.

Results

Despite the short time frame, the project team delivered record drilling times for six different wells. With a 25 to 60% reduction; on average, to drilling time, this resulted in significant financial savings for the customer—signaling a new phase of the project. The client demonstrated appreciation of the outstanding results achieved by IPM by extending the project from the initial 18-month agreement period to two years.

Mexico

Well Construction and Intervention: Geothermal Wells

Challenge

Schlumberger Integrated Project Management (IPM) was awarded a project to drill six geothermal wells, having never executed this type of well in Mexico previously. Other significant challenges were presented by the remoteness of the target area (including logistical issues which would require innovative solutions), massive fluid losses experienced by the target, and volcanic formations in local geology, which would probably need a slower rate of drilling.

Solution

Schlumberger IPM planned to resolve the challenges through use of an Integrated Services approach and application of new technology. IPM solution provision included

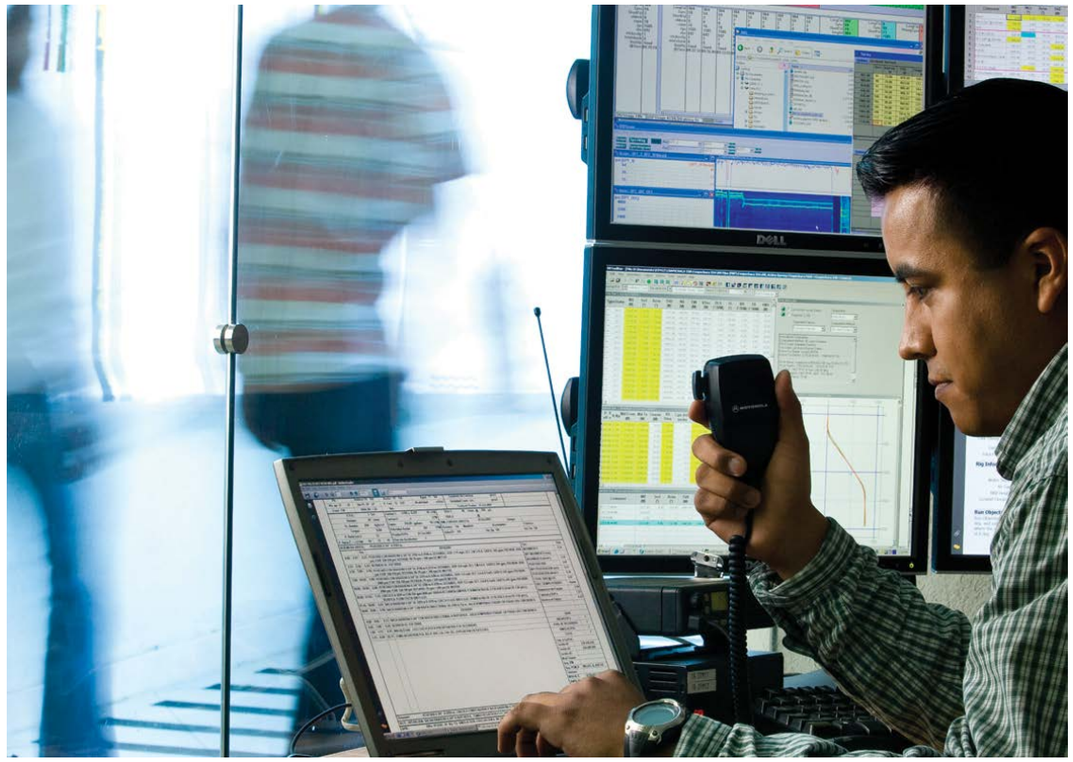
- optimized directional well trajectory to avoid tools damage
- DRILLPLEX fluids application to mitigate fluid losses (60% of losses were mitigated in the 17½-in section)
- new technology rock bits: increasing drilling performance and achieving longer runs
- improved logistics and added value to operations through project coordination, and application of CemNET* advanced fiber technology to control losses.

Results

Schlumberger IPM business model and application of new technologies resulted in drilling of the first geothermal well in 63 days versus the originally planned 75 days.

Mexico

Well Construction and Intervention–
Rig Management: Field Development



Active project

Challenge

Client fields located in the southern coastal region of Mexico held significant strategic importance for the operator as a result of the high-quality crudes used in the Mexican mix blends. The operator had set itself ambitious production targets, which Schlumberger was tasked with delivering.

Dealing with high-pressure vertical, horizontal, and deviated wells that were, on average, 6,500 m deep and 166 degC, meant that the planning and execution phases of this project would be key to the operation's success. The drilling of wells was averaging between 120 and 250 days, with many wells being depleted.

Solution

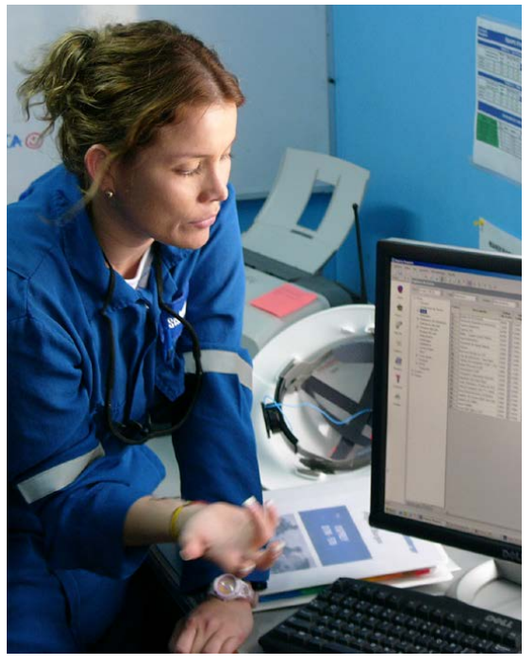
IPM planned a well construction and intervention project to drill 50 deep wells, using 10 client-owned or contracted rigs, including Schlumberger technologies, third-party services, and civil works. A workforce of 990 Schlumberger employees and 160 IPM professionals was to be dedicated to the project.

Results

The project, people, and 10 client-owned or contracted rigs were mobilized towards the end of 2007 and beginning of 2008. An Operation Support Center, dedicated to the field, was put in place at the end of 2007.

Mexico

Well Construction and Intervention–Well Production and Intervention–Rig Management: Field Development



factory™ DRILLING

Key facts

- >1,000 wells drilled
- Scope from civil works for tying well into production
- 110 IPM employees, 800 Schlumberger employees
- Dedicated world-class base

Active project

Challenge

A Mexican basin, discovered in 1945 and (to date) known to contain more than 200 fields in an area of 50,000 km^2 is one of the largest gas-bearing areas in North and Central America and is a significant resource within the region. With Mexico being a net gas importer, development of the area's potential was a clear priority for the operating client. The key challenge of the basin is drilling cost-effective wells.

Solution

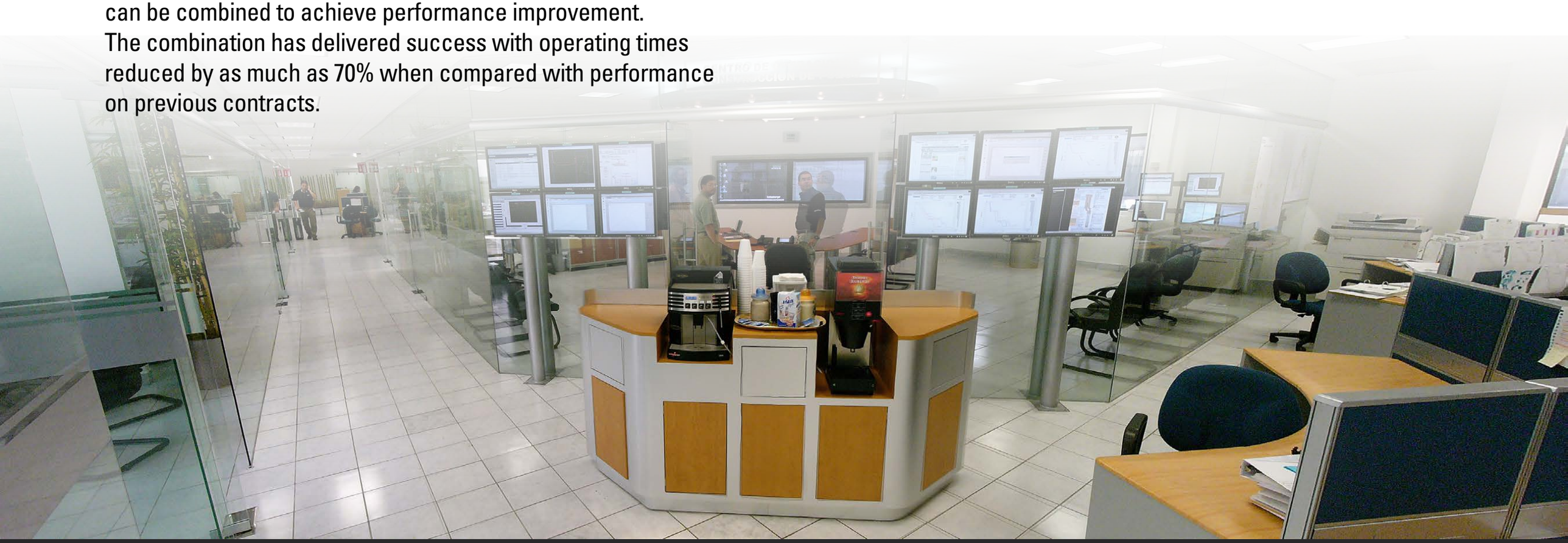
Historically, Schlumberger has played a significant part in the basin's development. Schlumberger applied an Integrated Services (IS) approach when the project was first awarded in 1997. These contracts included the drilling of a number of wells and maintenance of the associated production facilities. The business model was successful as it proved that the gas in the area could be extracted in a cost-effective way. With a significant part of the contract covering third-party services, excellence in execution depended on careful management against a background of rising prices for rigs, steel, and services. As a result, the Schlumberger team focused on increasing performance through the redesign of products for optimum cost, while reducing risk through careful

mitigation of operational risk. In addition, service quality was carefully upheld in consideration to its contribution to overall project cost.

Results

The project is one of the most significant world-class examples of Schlumberger teamwork that demonstrates how Schlumberger technology, Integrated Project Management (IPM) processes, and innovative project structure can be combined to achieve performance improvement. The combination has delivered success with operating times reduced by as much as 70% when compared with performance on previous contracts.

The business impact has been clear with the customer benefiting from accelerated production, and Schlumberger delivering economic performance through carefully synchronized teamwork, re-engineered processes, and innovative technology deployment. In addition, more than 900 local jobs have been directly created, with a further 2,200 indirect jobs among more than 70 local contractors.



Mexico

Well Construction and Intervention–Well Production and Intervention–Rig Management: Field Development

Key facts

- 7 to 10% recovery factor
- Environmentally challenging area, complex subsurface environment
- Seven fit-for-purpose pad drilling rigs
- 500-well project
- Dedicated Regional Technology Center
- New world-class base

Challenge

The Chicontepec basin was found in 1927, but due to the local terrain, environmental impact, complex subsurface reservoirs, and technical limitations, the basin was never explored to its full potential. The challenge was to develop the basin's complex reservoirs in a cost-effective manner while managing the environmentally sensitive surface issues. Pemex, the national oil company of Mexico, had publicly stated its intention to increase production from 35,000 bbl oil/day in 2007 to 780,000 bbl oil/day within 10 years (by 2018), with the aim of drilling 700 wells in 2008. In 2007, Pemex signed a four-year contract to develop 10,000 km2 of the region.

Solution

Using processes and technologies developed by Integrated Project Management (IPM), a pad drilling approach was implemented to deliver up to 19 drilled wells and support simultaneous drilling and completion. The DTM-designed drilling rigs reduced the same-pad rig move time to just a few hours—and inter-pad moves to inside 24 hours. IPM also deployed seven fit-for-purpose rigs, with a total of 11 planned by the end of 2008. The “technical limit” approach was used to lower operating times to a minimum, while additional gains were expected from the utilization of new technologies like CO2 fracturing and dual mast rigs. An Operation Support Center was also set up to follow up and assist operations remotely.

Results

More than 80% of the current field production comes from wells drilled by IPM. Drilling times have been reduced by 30% since 2003. Today, wells are consistently drilled in less than 8 days while completion runs between 20 to 30 fracturing jobs every month.

Mexico

Rig Management: Joint Drilling Venture

Active project

A joint-venture operation between a Canadian partner and Schlumberger, provides fit-for-purpose rigs and crews for the Mexican environment.

Fleet

The joint venture operates a fleet of nine light- and three medium-capacity rigs.

Summary

In its few short years of existence, the partnership has become the leading international land contractor in Mexico and through innovation, has created step changes in the drilling process, particularly in the Chicontepec basin. Innovative new rig technology, such as rack and pinion technology, variable frequency AC drives, and automation are all in development.

Oman

Rig Management: Sea and Land Drilling

Key facts

- A specially adapted rig for quick desert moves (desert ramblers)
- 75% of our crew is of Omani nationality

Active project

Challenge

Schlumberger has a long history in Oman, dating back to 1971. Oman's desert environments can be extremely challenging to operate in, with very high ambient temperatures and harsh conditions that require specialist technology and personnel skills.

Solution

To counter the difficulties of the desert environment, Schlumberger has designated a fleet of highly mobile, fit-for-purpose rigs that are specifically designed for desert environments. The fleet is made up of one light-capacity (1,000 hp) rambler rig, and five medium-capacity (2,000 hp) rigs, which cover operations from shallow oil development to deep gas exploration in remote desert environments.

Results

Schlumberger has more than 40 years of continuous operations in Oman, with all rigs working for a joint-venture company owned by the Omani government and a partner client.

Pakistan

Rig Management: Desert and Mountain Rigs

Key facts

- Operations are based out of Islamabad
- Rig 23 drilling in North Pakistan
- Rigs 15, 25, and 60 drilling in South Pakistan
- 94% of the rig-based crew is local

Challenge

The Pakistan drilling environment ranges from mountainous to hot desert, with temperatures ranging from 40 degC to sub zero. Local security and logistics are other serious challenges in Pakistan.

Solution

The Schlumberger fleet has been working in Pakistan since 1988 and consists of four rigs—one of medium capacity (1,200 hp) and three heavy-capacity rigs (1 x 2,000 hp and 2 x 2,500 hp). Operations are based out of Islamabad and are fully self-sufficient—maintenance facilities staffed with skilled people who have knowledge of the business. Three of our rigs are currently more than 1,200 km from our Islamabad base.

Results

The rigs are currently working in the north and south of Pakistan, for a number of different clients.

Russia

Well Construction and Intervention–Well Production and Intervention: Offshore Eastern Russia

Key facts

- Long-term Integrated Services (IS) contract for well construction services
- One of the world's largest oil and gas developments
- Project location in environmentally sensitive and remote area
- Stringent environmental requirements set by Russian government
- Temperatures frequently below -20 degC
- Deployment of latest technology

Challenge

A client has been developing oil and gas since 2003, offshore Eastern Russia, in an environmentally sensitive and remote area. The project is one of the world's largest oil and gas developments, involving one gas and one oil field. Our client rigorously follows the strict Russian government environmental requirements and has adopted a zero discharge policy as one of its main themes. During the long winter, temperatures frequently drop below -20 degC, requiring continuous effort to ensure equipment and materials function adequately. The limitations on the types of equipment, materials, and chemicals that can be used in this type of weather combined with the high personnel competency requirements and long lead times for such a remote location make a comprehensive planning and engineering effort essential.

Solution

In 2003, Schlumberger won a long-term IS contract for well construction services. Drilling activity started on one platform and was then expanded with the start up of a second and third platform in 2007 and 2008.

The project continued to mature and evolve according to the fields' changing requirements. Multiple completions, well intervention services, and updates to well construction requirements have been added to the project scope to meet these new challenges.

Notable among these was the deployment of the latest rotary steerable and LWD systems, wireline tractored production logging tools (PLTs), intelligent completions systems, lightweight cement slurry systems, a permanent WCU and large-scale coiled tubing operations for the gas well perforating and cleanup, shoot, and drop TCP techniques, along with many of the latest Schlumberger technologies and services.

Schlumberger Integrated Project Management (IPM) managed the contract and was responsible for the 12 current scopes of work. In addition to the contracted IS scopes, the Schlumberger team worked closely with M-I SWACO drilling fluids and waste management services. A team from IPM, with substantial expertise, was based in the client's office throughout the contract period, maintaining close engagement with all well and completions engineering activity. In addition, this team closely co-ordinated Schlumberger activity and provided a single point of contact for each asset. The team was successful in enhancing communications between the two, now large, organizations during increasingly complex well operations.

Results

- Multiple wells drilled between 2003 and 2005 followed by periods of workovers and well interventions and then platform rig package shutdown since 2007.
- Restart of platform rig package in 2012 with a sustained drilling and workover schedule for multiple years ahead
- Platform oil production around 80 k BOPD
- Five intelligent water injectors
- Nine oil producers drilled to date, four of which have multizone intelligent completions installed
- Cuttings re-injection well drilled
- Platform oil production around 70 k BOPD
- 5 x big bore and 2 x super big bore gas wells
- 1 x oil rim producer well
- 2 x produced water and cuttings re-injection wells drilled
- Platform gas production capacity of around 1.5 billion SCF/day

Russia

Well Production and Intervention: Well Control Program

Key facts

- 23 out of 23 planned wells controlled
- 109 operating days (1,892 hours)
- 313 hours extreme weather temperatures below -40 degC (the operating limit)
- 62 trips of heavy equipment
- 215,800 km driven accident free
- Excellence in execution: zero Schlumberger equipment failures

Challenge

A client acquired gas and condensate assets in the Northern Siberian Arctic Circle area. As part of its initial field redevelopment plan, two fields had wells that required immediate control of the well so workover operations could be performed. Some of the wells had leaking well heads that could not be shut.

In the area, well head connections, fittings, and piping were found to be substandard and the completions consisted of only tubing, with no downhole packer.

Solution

IPM provided an Integrated Service intervention package that included the necessary expertise, personnel, equipment, and project management to undertake this challenging project.

The scope of the project involved controlling 23 wells during midwinter in two separate fields. The operation took place during the harshest winter season when temperatures drop below -40 degC with only four hours of daylight.

Results

All 23 of the planned wells were secured. The client was able to move into the next phase of its drilling and workover program, which required up to 10 drilling units by 2010 and approximately 200 wells by 2015.

Russia

Well Construction and Intervention: Sidetrack Reentry

Key facts

- 10 rigs for various clients across East and West Siberia
- Six new builds in construction

Challenge

Russia currently has over 150,000 producing wells, and approximately 50,000 abandoned wells. Many wells were drilled between 1940 and 1970, with good casing integrity. The cost of reentering an abandoned or existing well, and sidetracking into the formation is around 50% of the cost of a new well.

Solution

The project consisted of reentering existing wells and drilling horizontal holes to tap bypassed oil in areas that were being produced using water flooding. Using eight Schlumberger rigs, the project involved sidetracking at a kick-off point around 2,000 m true vertical depth (TVD), building an angle from 0º to 90º over an extension of 300 m. Integrated Project Management (IPM) used its developed tailored process for sidetracking which involves five main steps:

1. Screening for areas of interest
2. Analyzing the remaining potential
3. Designing re-entry wells
4. Managing risk and the wells' economics
5. Executing operations and ensuring continuous improvement

The process involved four Schlumberger business areas:

- Project management, rigs, supervision, and engineering from IPM
- Candidate selection and geosteering by petrotechnical services
- Directional drilling and LWD from drilling and measurement services
- Cementing services by well services

Results

The project had 10 rigs working for various clients and used a combination of Russian and Western technology to provide low-cost and consistent performance. Data was fed in real time to our operations support center in Russia to allow remote monitoring and improve efficiency. Initial production from the sidetracked wells was between 700 and 1,300 bbl oil/day, well above the production rates of the wells before they were sidetracked.

Russia

Integrated Services–Well Construction and Intervention:
Polar Hub

Challenge

The weather presents a major challenge in drilling horizontal wells in the Kara Sea's Gyda Bay, in the remote polar region of northern Siberia. Temperatures can drop below -55 degC and this is hard on equipment and personnel and adds an additional level of complexity to the project.

The drilling location is over 1,000 km from the support base, making logistics a major challenge. Winter access is via winter roads and summer access is via navigable river transport. In the spring and early winter there is no access into the field and proper planning is required to ensure all materials are available on site during these periods.

Solution

The IPM team works closely with the rig contractor, the segment suppliers, and third parties to plan and execute these wells. Proper logistics planning is vital to ensure that the rig is able to continue operating during the periods when there is limited access to the field.

To combat the harsh environment, the rig is fully winterized and heated with steam lines that prevent the rig freezing up. Personnel safety in such harsh environments is a major focus for the team. Extreme cold will kill very quickly, and proper precautions need to be implemented for personnel safety.

Results

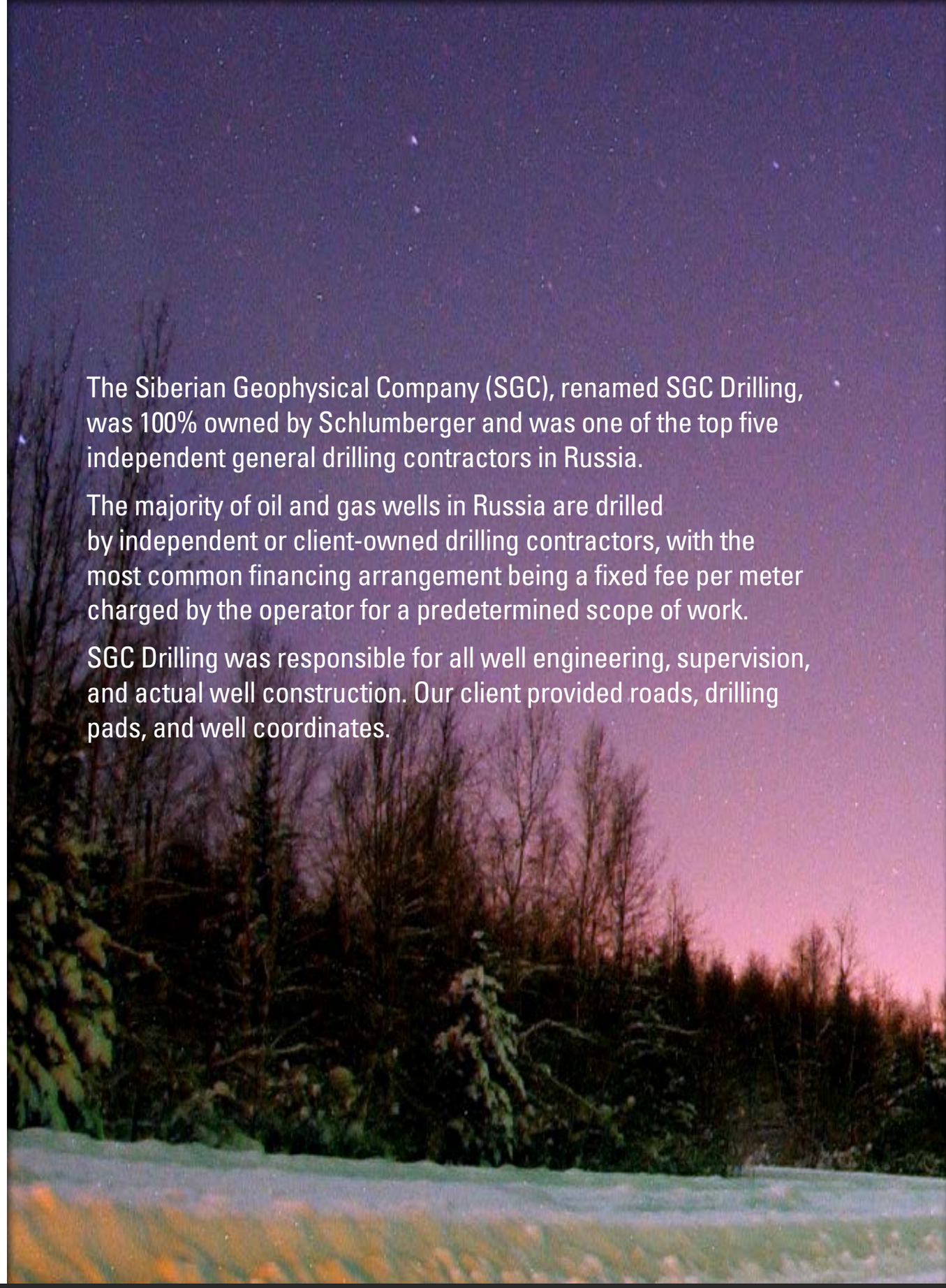
The team completed the first horizontal well to nearly 4,000 m depth in 263 days. This was the first gas well IPM had drilled in Russia, and as a result of major equipment challenges, mostly relating to the rig power supply, it experienced considerable delay and financial loss. These challenges were successfully addressed and the team went on to spud the second well confident that the equipment issues were behind them. The planned duration for the second well was 115 days.

Russia

Rig Management: Drilling

Key facts

- Number of employees: 1,500
- Number of crews: 13
- Number of cementing fleets: 5
- Best performing crew: > 8,000 m in 30 days
- 590,000 m drilled in 2007



The Siberian Geophysical Company (SGC), renamed SGC Drilling, was 100% owned by Schlumberger and was one of the top five independent general drilling contractors in Russia.

The majority of oil and gas wells in Russia are drilled by independent or client-owned drilling contractors, with the most common financing arrangement being a fixed fee per meter charged by the operator for a predetermined scope of work.

SGC Drilling was responsible for all well engineering, supervision, and actual well construction. Our client provided roads, drilling pads, and well coordinates.

Fleet

SGC Drilling had a significant footprint in the West Siberian market. The business was structured around two affiliates that were based in Neftyugansk and Strezhevoi. The fleet consisted of 15 winterized rigs, 12 of which were suitable to depths of 3,000 m, and three deep- capacity rigs suitable to 4,500 m.

Summary

With expansion of SGC's client base and capabilities, drilling successful horizontal wells became regular day-to-day business. A proactive HSE and a service quality culture was developed and included the application of operational lessons learned.

While SGC Drilling was under Schlumberger management, it developed significantly in an industry that has an abundance of general contractors. Advancements in SGC Drilling's service capabilities have assured the company's future growth.

SGC was divested by Schlumberger in 2010.

Saudi Arabia

Rig Management: Arabian Drilling Company

Key facts

- Five offshore rigs
- 16 land rigs
- 58% of rig-based crew is local
- 35 Schlumberger employees seconded to the joint venture

Active project

The Arabian Drilling Company (ADC) is a joint venture partially owned by Schlumberger and TAQA. ADC started as a joint venture in 1964 between Languedocienne-Forenco and the Saudi Arabian Ministry of Petroleum and Mineral Resources with a single rig.

Fleet

Today, more than 45 years on, ADC owns a fleet of rigs (two of which are long-term leased rigs) comprising five offshore jackup rigs, nine medium-capacity land rigs, five heavy-capacity land rigs, and two ultradeep-capacity rigs. ADC's fleet has doubled in size during the last three years and has skilled people, industry knowledge, excellent maintenance facilities, and a significant footprint in Saudi Arabia.

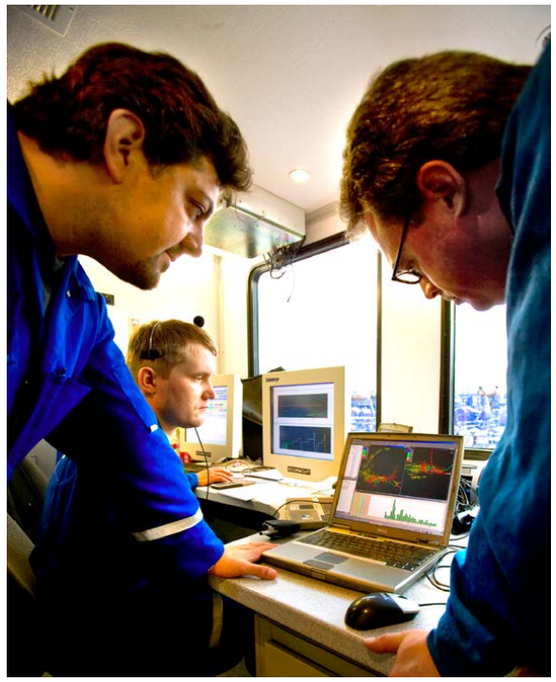
Summary

Currently, 18 of the rigs are working in the Eastern Province of Saudi Arabia and three are working offshore in the neutral zone.


AD-16

USA

Well Construction and Intervention–
Well Production and Intervention: Barnett Shale



Challenge

A greenfield development of two North Texas Barnett Shale fields consisting of approximately 4,000 acres (16 km^2) was located in an urban environment.

The proximity to homes, schools, public parks, and businesses provided a high level of operational complexity and an increased focus on HSE issues. Furthermore, relations with property owners had the potential to be extremely delicate and were essential to the project's success.

The wells in the area are known to be extremely marginal because of well productivity and high costs. The key challenge was using technologies wisely to ensure that the cost of technology deployment was compensated with superior production results.

Solution

In early 2007, Integrated Project Management (IPM) began a six-week field management project at the Barnett Shale, with the possibility of an extension of 30 additional wells. A team was assembled around offices in Dallas. The team frequently liaised with the communities and with local residents, running the operations at the highest level of compliance.

The marginal nature of the project placed an emphasis on cost and the search for technologies which would increase results without a heavy cost burden (the driver for which was low finding and development (F&D) costs).

Results

A good relationship was developed with the communities and land owners. This, coupled with exceptional production results, meant that the team was able to expand the project's acreage position. Schlumberger IPM has become a recognized operator in the Barnett basin.

Costs continued to decrease as the project team achieved high efficiency. The team is continually looking to improve the contractor base and leverage market forces to reduce costs. Furthermore, the team continues to leverage lessons learned to improve execution efficiency without sacrificing the effectiveness of the operations. The F&D costs declined by 33% in 2007.

USA

Well Construction and Intervention–
Well Production and Intervention: Waddell Ranch

Challenge

Waddell Ranch is a mature area of Texas that had, at the time of the project, more than 1,000 active producing wells and 300 water-injection wells in an area of approximately 80,000 acres (320 km^2). The project included 47 fields producing from 14 horizons, with six major fields accounting for more than 90% of production. The challenge at the Waddell Ranch project was to maximize long-term profitability of the field by increasing production and lowering lifting costs.

Solution

For the period of the project, Integrated Project Management (IPM) was responsible for the general management of the Waddell Ranch project, on a performance-based field management contract. IPM responsibilities included production and operations engineering, field operations, revenue accounting, joint interest billing accounts payable, and materials management. On average, the IPM project management team included 35 technical professionals.

Considerable focus was placed on maintaining base production while minimizing well failures. In parallel with this focus on base production was a focus on generating and implementing a capital program to develop both new and behind-pipe reserves.

Results

The reserves replacement ratio was greater than 1.0. Production significantly increased and direct lifting cost was significantly reduced. The well failure rate became a benchmark for the industry in the Permian basin.

Venezuela

Rig Management: Land and Lake Drilling

Key facts

- Three heavy-capacity land rigs
- Rig 97 is the largest in the RMG fleet, and has drilled the deepest Venezuela well of 6,660 m in 2007
- Rig 46 completed two accident-free years in May 2007
- Three cantilevered drilling barges
- Three self-propelled workover lift boats
- > 700 wells drilled and >1,200 wells worked over on Lake Maracaibo

Active project

East Venezuela (land)

In the eastern state of Monagas, Venezuela, Schlumberger operates three heavy duty rigs for a state oil company. The three rigs were built for the environment of East Venezuela and arrived in the mid 1990s. Rig 97 is the heaviest rig in the Schlumberger fleet, and its sister rigs were purpose-built in Houston during the mid 1990s.

The land fleet

Our rigs are solid, well outfitted, with seasoned crew and support staff. Our fleet consists of three heavy rigs (2 x 2,000 hp and 1 x 3,000 hp).

Summary

Our three rigs (46, 50, and 97) are well regarded by the client as efficient and safe. Rig 97 is the client rig of choice for deep complicated exploration wells in Eastern Venezuela.

West Venezuela (lake)

Lake Maracaibo in Venezuela has a long history of development dating back to the pre-World War II. Modern technology and underperforming existing wells prompted Petróleos de Venezuela S.A. (PDVSA) and Schlumberger to look at how wells were drilled and intervened in the min 1990s. A new generation of custom-built rigs was the answer.

The lake fleet

Schlumberger designed, built, and operates three custom-designed drilling barges and three jack-up multipurpose service vessels (MPSV) suitable for 45 m and 30 m water depths respectively. These rigs operate with significantly higher efficiency by integrating services, reducing the sensitivity to weather-related delays, and by streamlining logistics with a dedicated logistics support fleet.

The three drilling rigs are cantilevered barges, 750 hp, designed for the shallow wells of the coastal fields of Lake Maracaibo.

The workover rigs are self-propelled liftboats, designed to efficiently service shallow wells by incorporating coiled tubing, cementing, and logging equipment into the rig design. The self-propelled liftboat design reduces time between wells and minimizes weather-related nonproductive time by performing the workover operations on an elevated platform.

Summary

The first rigs arrived in 1999, with the remaining rigs arriving in 2000. Since than, more than 700 wells have been drilled, and over 1,200 wells have been worked over, clearly contributing to client production targets.