

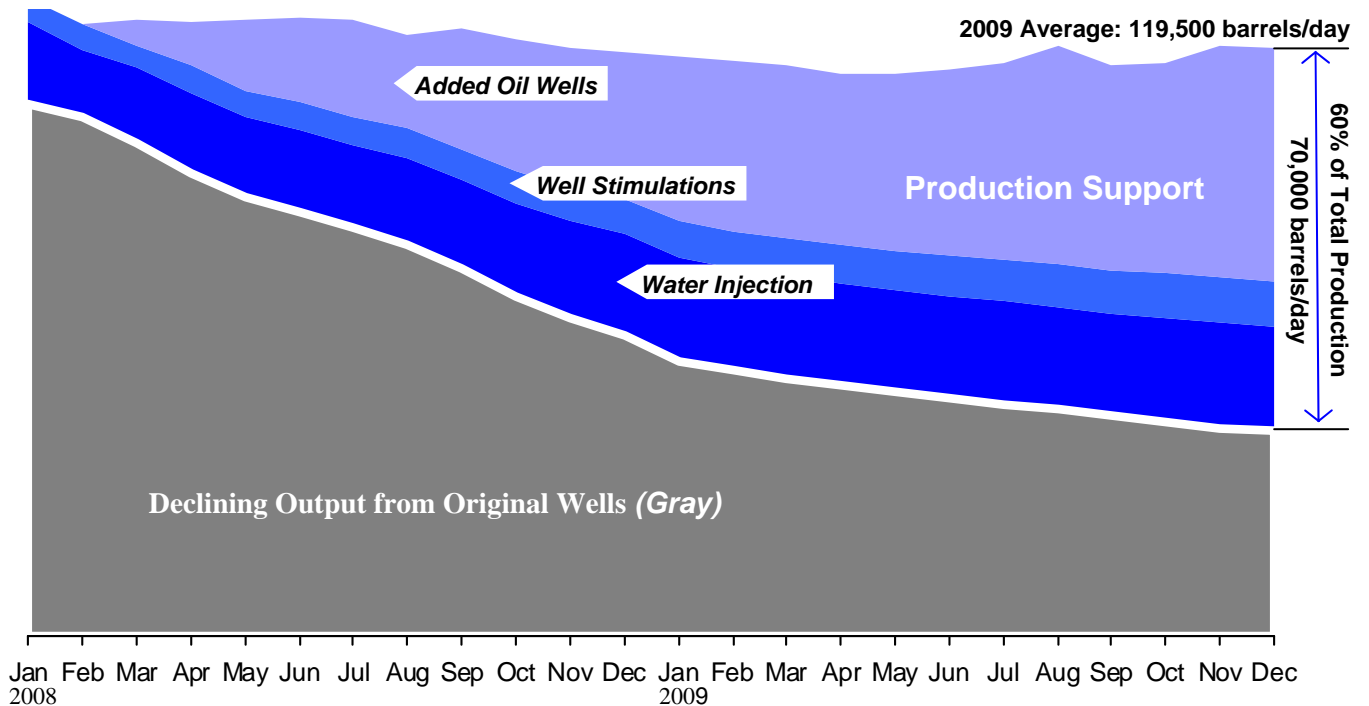
Section 2

Production & Construction

A two-year program of oilfield production support achieved its goal in 2009. Daily crude oil output levels have been stabilized, and production averaged 119,500 barrels per day for the year.

- Since 2007, the project has invested nearly \$1.6 billion (about 770 billion FCFA) in production support measures responding to the challenging characteristics of the Doba Basin oil formation.
- In 2009, production support spending totaled \$573 million (more than 275 billion FCFA), including \$465 million in capital investments and \$108 million in day-to-day operations directly related to sustaining production.

◀ Results from Production Support Investments (2008/2009 in thousands of barrels)



Production support investments made over the last two years contribute about 70,000 barrels per day to the project's crude oil production. Without the Consortium's investments, production would have fallen below 50,000 barrels to around 40% of the current yield of 119,500 barrels per day from the oilfields.

Doba Basin Challenges Major investments in production support have been required to overcome highly challenging geological and oil formation conditions in the Doba Basin.

- As the oilfields were being developed, it became clear that the Doba Basin oil has low mobility, impeding the extraction of oil and requiring more oil wells than originally planned.

The project added 93 new oil wells in 2009, bringing its total number of oil wells to 570, not including wells for reinjecting water recycled from oil processing. The pace of new well drilling increased by 55% in 2009, made possible by the addition of two rigs for drilling, completing and renovating wells. The first of four wells in the new Timbré field came on line in 2009, adding production as well as a supply of gas to help power the electric generating turbines that power the oilfields.

- The Doba Basin oil resides in unconsolidated sands that produce fine particles which migrate to the wells and clog the producing zones. Techniques to counter this problem include well stimulations to backwash the pores in the oil bearing formation in addition to upgrades and repairs of subsurface well pumps that suffer from the clogging problem.

The project's well work team conducted 643 renovation and enhancement procedures on oil wells during 2009. In addition, a deviated drilling program drilled ten wells in the year, some of them to restore wells by drilling fresh bores parallel to ones that had been failing.

- Pressure in the Doba Basin oilfields dropped sharply as oil was extracted. Pressure must be maintained in order to sustain production levels and the answer has been a high pressure water injection program.

A third phase expansion of the high pressure water injection program was launched in the second half of 2009. So far, a total of 55 water injection wells have been brought online.

The project's efforts to maintain production levels, coupled with world market prices for crude oil, have important impacts on Chad's oil revenue. For updated information on project payments to Chad, see the chapter *Chad's Oil Revenue*.

At year end, even as more oil wells and associated infrastructure were being added to extract oil, land use mitigation efforts kept the total land area utilized by the project at a constant level. For more information, see the chapter *Land Use in the Oilfield Development Area*.

Production Statistics The project has so far sent to world markets 331 million barrels of crude oil in 366 tanker shipments. The project's average daily production for 2009 was 119,500 barrels per day, about 6% below the level achieved in 2008.

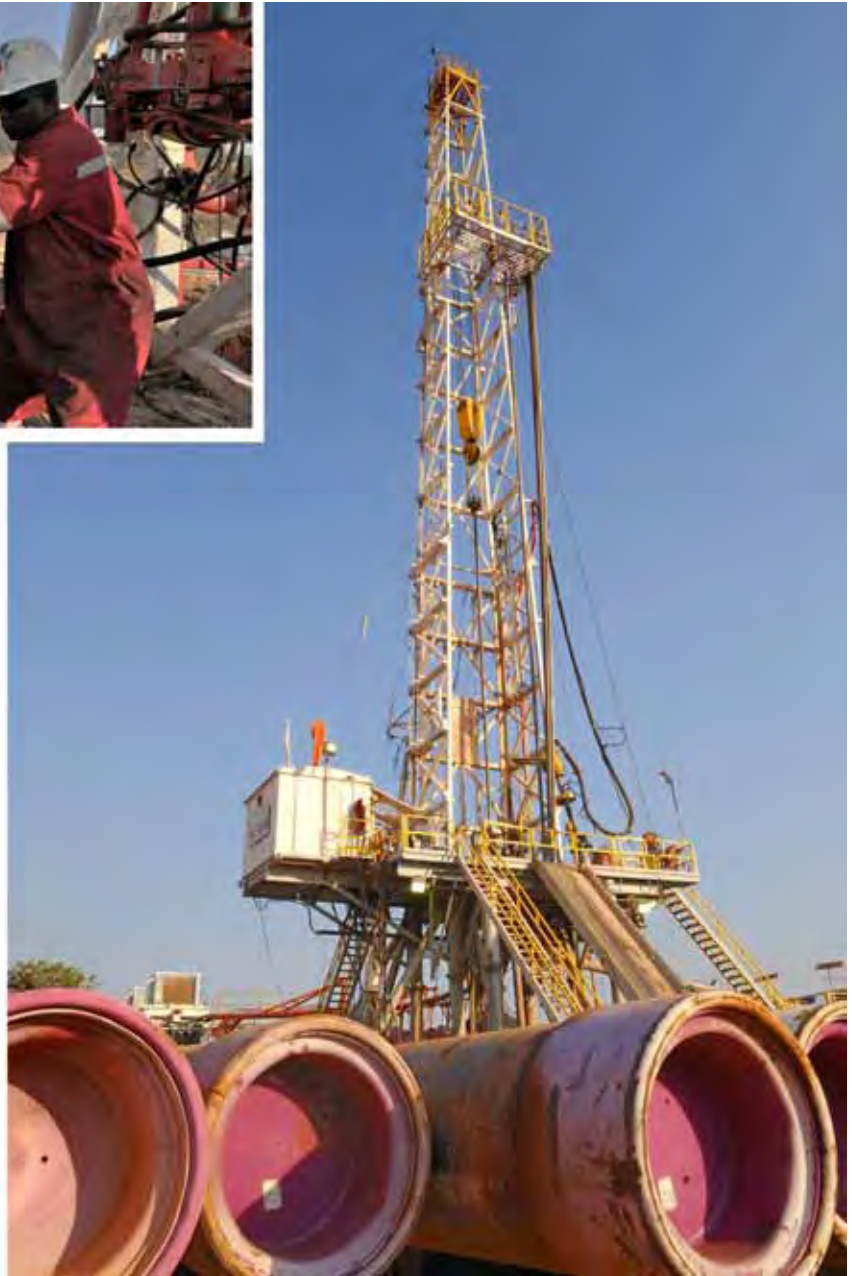
◀ **Production Statistics for Last Four Quarters**
(net volume of shipments from marine terminal)

	1st Qtr 2009	2nd Qtr 2009	3rd Qtr 2009	4th Qtr 2009	12 Month Total	Project to Date
Millions of Barrels	10.5	10.6	10.6	11.3	43.0	331
Export Tankers	13	12	12	13	50	366

Two New Rigs: Drilling the Wells



The project added two new rigs in 2009, bringing the total to six. The additional equipment made it possible to increase the rate of drilling new wells by 55% compared to 2008. The crew (top) on this drilling rig (right) begins the process by boring the well and setting the metal casing pipe that forms the permanent wall of the well. A smaller rig is called a completion rig because it follows the drilling rig and completes the process by, among other things, installing the pump required to lift the oil to the surface and opening holes in the casing for the oil to flow into the well.



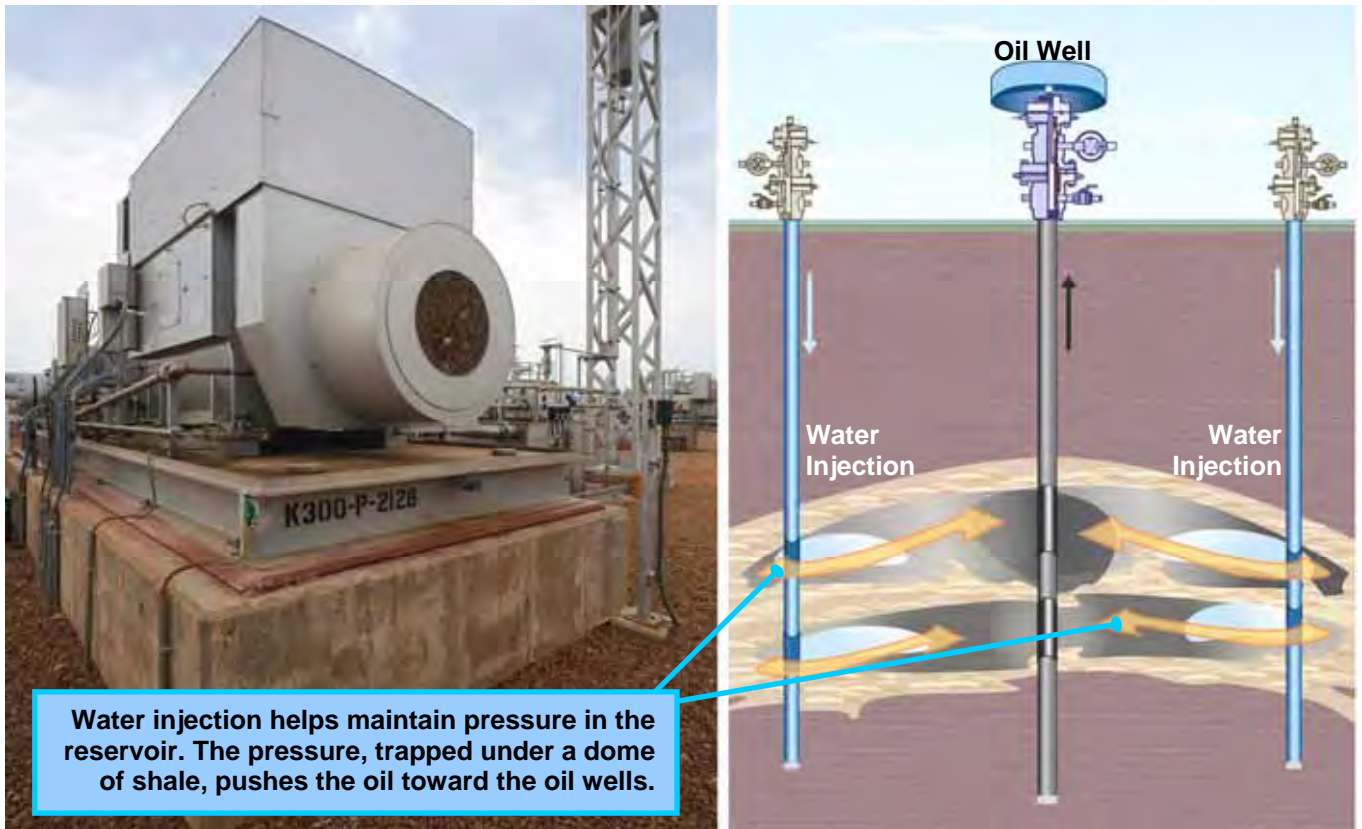
Two New Rigs: Completing & Maintaining the Wells



One of the two new rigs added in 2009 was this completion rig (top right), bringing the total number of rigs on the project to six: three large drilling rigs, two of these smaller completion rigs plus a truck mounted mobile rig. In addition to finishing the process of constructing new wells, the crews (top left and middle) on the completion rigs maintain existing wells. For example, they replace subterranean pumps that break down or need to be replaced with a different type of pump to respond to the conditions deep underground in the oil bearing formations. In December, this crew accomplished an unusual well repair by replacing a gravel pack screen (right). The screen was set in place when this well was first completed, some years ago. Over time, holes eroded into the screen, allowing sand to penetrate into the well, reducing its effectiveness. By inserting a new screen the well was restored to full production.



Water Injection & Well Stimulations



In order to produce an average 119,500 barrels per day of market ready crude oil in 2009, the project extracted nearly 754,000 barrels of fluid each day. At the Komé Central Treating Facility, water and sediments are removed from the fluid to ready the oil for export to market. Thus, around 84% of the fluid withdrawn by the project's oil wells is water, technically called the "water cut." The water from the Central Treating Facility is piped to massive pumps (left) which connect to injection wells, sending the water deep underground (right) to the oil bearing level, a high pressure water injection technique that helps to support production. To date, 55 injection wells have been put into service and the project launched the third phase of its water injection program in the second half of 2009.

Each of the project's wells must be individually maintained for optimum performance in order to sustain production levels. For example, frequent well stimulations (right) inject brine or other fluids through the well head under high pressure, backwashing the fine particles that tend to clog the wells in the sandy Doba Basin oil formations. The project performed more than 640 well stimulations and other well enhancement procedures in 2009, a rate of more than one per well for the total 570 wells brought on line so far.



Rapid Response: Landslide Cuts Fiber Optic Cable



Rapid response by project maintenance crews quickly restored a broken fiber optic cable in a remote area of Cameroon between Lolodorf and Kribi. A land slippage in October along the pipeline right of way (top left) did not harm the buried steel oil transportation pipeline but severed the fiber optic communications link. The project's backup satellite system for pipeline control ensured that the oil kept flowing. However, through a unique arrangement with the government of Cameroon, the national telephone company has been granted use of about two-thirds of the optic fiber in the cable for national phone and Internet service. Without backup, the southern coastal area of Cameroon briefly lost much of its civil telecommunications ability. Since there was no road to the site and heavy equipment could not be deployed, a temporary log bridge (top right) had to be constructed over the Mbikiliki River to allow crews in to excavate the break (middle left and right). A field splicing team (bottom right) immediately installed a temporary cable and plans are underway for a permanent repair.

