

Section 2

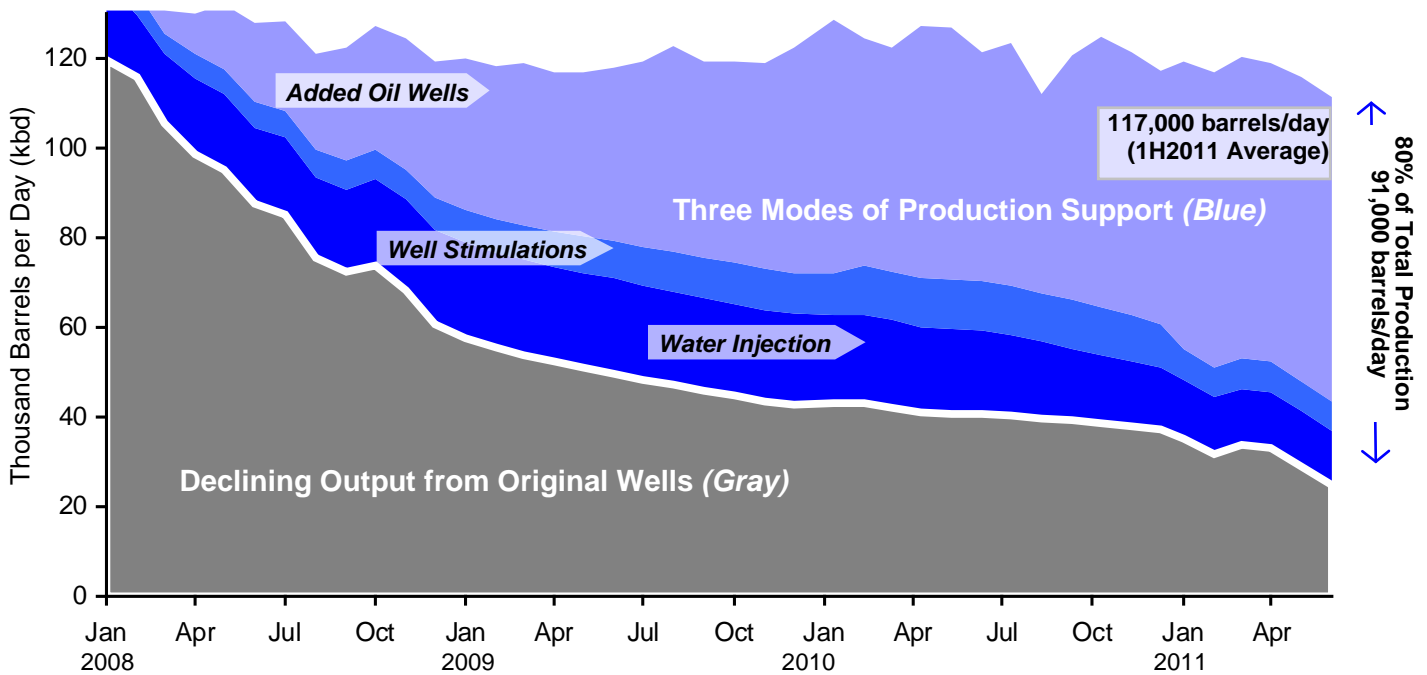
Production & Construction

By mid-year 2011, the project had invested over 1,300 billion FCFA (\$3.0 billion) in initiatives aimed at maintaining production levels. In addition to drilling new oil wells, the production support investments in the project's Doba Basin oilfields included a high pressure water injection program and hundreds of well stimulation procedures. As a result – even as the project's oldest oil wells mature and their output declines – the 2011 daily production rate has so far been sustained at about 117,000 barrels per day, a level roughly 5% below the average level for 2010.

In the first half of 2011, spending on production support totaled 160 billion FCFA (\$350 million, including \$250 million in capital investments and \$100 million in day-to-day operations directly related to sustaining production).

Results from Production Support Investments (in thousands of barrels)

At mid-year, project production support investments were contributing about 91,000 barrels per day to the project's crude oil output. A recent reassessment of the project's reservoir models showed that the natural decline in base production is occurring faster than initially assumed, and as a result, without the Consortium's investments, production would have fallen to about 25,000 barrels – just over one-fifth of the current yield of 117,000 barrels per day.



From Chad to the
World

In the savanna of southern Chad, an intricate maze of pipes, tanks and processing equipment at the Central Treatment Facility turns frothy emulsion from oil wells into valuable pure crude oil ready for sale in global markets. It then sends the crude oil on its way through the 1,070 kilometer export pipeline to the marine terminal where tankers pick up the crude and deliver it to refineries.

Making Chad's
Oil Ready for
Market

Gathering: A network of manifold yards joined by underground pipelines gathers unprocessed oil from hundreds of wells. The oil as it first comes from the ground is called emulsion, a frothy mixture of petroleum, water, gas and impurities. In a series of steps the pipelines and manifolds gather the streams of oil into larger and larger oilfield pipelines, finally delivering the unprocessed emulsion to the Central Treatment Facility.

Separating: At the Central Treatment Facility, the water gets removed first. Water makes up about 85% of the emulsion before it's processed and the water must be removed to make the oil ready for sale. In addition, the emulsion almost always contains some natural gas that must be separated during the treatment process.

Purifying: Freshly extracted oil contains impurities including particles of sand and potentially corrosive compounds. Equipment at the Central Treatment Facility removes these impurities before transporting the oil because they can harm pump, storage and pipeline equipment.

Transporting: Finally, when the Central Treatment Facility has transformed the emulsion into pure Doba crude oil, powerful pumps push the oil into the export pipeline. The pipeline transports the oil from Komé, through southern Chad, across Cameroon to Kribi. There, a floating marine terminal loads the crude oil onto export tankers that take it to market.

Each of these four main processing steps is managed by a control room and powered by an electricity generating station.

Controlling: It is important to note that all of these steps are managed through a state of the art electronic system from a control room at Komé with backup control facilities in several other locations along the pipeline.

Powering: Natural gas separated from the crude oil supplies energy to the four turbines that provide the electricity to power all the oilfield facilities.

From Chad to the World: Making Chad's Oil Ready for Market

This overview summarizes some of the complex processes at the Central Treatment Facility that convert the oil emulsion from the oilfields to pure crude oil ready for shipment to world markets by way of the project's export pipeline system.



Controlling: A team of trained operators manages the entire process from the master control room at Komé.



Gathering: A system of pipes and manifolds gathers the oil emulsion from the wells and delivers it to the Central Treatment Facility.



Separating: The emulsion in these storage tanks is separated into crude oil for processing, and water that is pumped deep back under the earth to maintain production pressure in the oil formations.



Powering: Natural gas contained in the emulsion is also separated and fuels the four-turbine power plant that provides electricity for the facility and the oilfields.



Purifying: Electrostatic treaters remove impurities from the crude oil, a last step before it is ready for shipment in the pipeline.



Transporting: The market-ready crude oil begins its long journey to refineries around the world here, the beginning of the 1,070 kilometer underground export pipeline.

From Chad to the World: Delivery at the Marine Terminal

Twelve miles off the coast of Kribi, Cameroon, this floating marine terminal fills its cargo tanks from the export pipeline and offloads the market-ready crude oil onto arriving tankers. Operations on this Floating Storage and Offloading vessel (the FSO) culminate the efforts of over 7,000 project workers who extract Chad's oil, process it for market and transport it 1,070 kilometers through two countries.



The tanker loading operation requires crews to orchestrate the positions of three vessels. The FSO pivots around a fixed permanent mooring (top) to allow for the forces of wind and sea. The waiting export tanker connects to the FSO through special floating hoses (bottom left) equipped with failsafe valves to guard against any spillage of oil. At the end of the chain, a powerful service vessel (bottom right) maintains constant tension on a cable to keep the FSO and the export tanker aligned.

Production Statistics

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

	3rd Qtr 2010	4th Qtr 2010	1st Qtr 2011	2nd Qtr 2011	Last 12 Months	Project to Date
Millions of Barrels	10.2	11.4	10.3	10.5	42.4	396.4
Export Tankers	12	12	12	12	48	438

◀ Production Investment Progress

- The project added 79 new oil wells in the last twelve months with 37 added in the first half of 2011. A total of 609 production wells were on line at mid-2011. *Additional wells help the project overcome the low mobility of the Doba Basin oil. Low mobility limits the effective draining radius of each well, requiring that wells be positioned closer together for optimum extraction.*
- The project’s wellwork team conducted 1,236 renovation and enhancement procedures on oil wells in the last twelve months, 565 of them in the first half of 2011. *The Doba Basin oil resides in unconsolidated sands, producing fine particles that 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 high pressure water injection program continues and a total of 56 water injection wells were on line at mid-year to support the program. Water makes up about 86% of the fluid extracted from project oil wells. *The high pressure water injection program addresses the sharp drop in pressure that has taken place in the Doba Basin oilfields as oil was extracted. Pressure must be maintained in order to sustain production levels.*

