



OTC 17915

Kizomba A and B: Projects Overview

B.D. Boles and G.E. Mayhall, ExxonMobil Development Co.

Copyright 2006, Offshore Technology Conference

This paper was prepared for presentation at the 2006 Offshore Technology Conference held in Houston, Texas, U.S.A., 1–4 May 2006.

This paper was selected for presentation by an OTC Program Committee following review of information contained in an abstract submitted by the author(s). Contents of the paper, as presented, have not been reviewed by the Offshore Technology Conference and are subject to correction by the author(s). The material, as presented, does not necessarily reflect any position of the Offshore Technology Conference, its officers, or members. Papers presented at OTC are subject to publication review by Sponsor Society Committees of the Offshore Technology Conference. Electronic reproduction, distribution, or storage of any part of this paper for commercial purposes without the written consent of the Offshore Technology Conference is prohibited. Permission to reproduce in print is restricted to an abstract of not more than 300 words; illustrations may not be copied. The abstract must contain conspicuous acknowledgment of where and by whom the paper was presented. Write Librarian, OTC, P.O. Box 833836, Richardson, TX 75083-3836, U.S.A., fax 01-972-952-9435.

Abstract

As Operator of Angola Block 15, Esso has completed several projects since November 2003, with production capacity totaling 590,000 barrels of oil per day. This paper will provide an overview of the projects from their development planning stages through start-up. Both the Kizomba A and B projects incorporate a surface wellhead, tension-leg platform that is close-moored to a floating production, storage, and offloading vessel (FPSO) in more than 1,100 m of water. Each project also includes offloading facilities and subsea wells and equipment. The FPSOs set records for size, each with processing facilities for 250,000 barrels per day throughput and more than 2.2 million barrels of storage. The Xikomba project, which incorporated an FPSO converted from a trading tanker, will also be described. The paper will address project management aspects of the various projects and highlight some of the unique aspects and challenges of these developments.

Exploration Overview

In August 1994 Esso Exploration Angola (Block 15), Ltd. (Esso) and its Coventurers acquired the rights to explore offshore Angola Block 15. Block 15 encompasses an area of 4,200 km² in water depths ranging from 200 m in the east to over 1,600 m in the west. The Angolan national oil company, Sonangol, is the concessionaire of the block, which is approximately 370 km northwest of Luanda, Angola and 145 km west of Soyo, a coastal town at the mouth of the Congo River.

Under a Production Sharing Agreement with Sonangol, Esso is the operator of Block 15 and holds a 40% interest. The other Block 15 Coventurers are BP with a 26.7% interest, ENI with a 20% interest, and Statoil with a 13.3% interest.

The Kizomba developments, which comprise several reservoirs, are named for a popular Angolan dance. Each of the Block 15 reservoirs has been named for Angolan musical instruments.

The initial exploration well on Block 15, Kissanje #1, was drilled in early 1998 to test three objectives in Middle and

Lower Miocene age reservoirs. Results from this well confirmed oil in each of the objectives. In parallel to Kissanje #1, a second rig was employed to drill the Marimba #1 wildcat. This well, located 13 km west of Kissanje, also yielded a successful Miocene test. By the third quarter of 1998, two additional successful exploration wells had been drilled in the Hungo and Dikanza reservoirs, and in 1999 discoveries were made in the Chocalho and Xikomba reservoirs.

As of December 2005, nineteen exploration wells have been drilled on Block 15, resulting in a world-class 90% success rate and seventeen discoveries. See Figure 1. Ten appraisal wells have also been drilled to confirm several of the discoveries, and all were successful in extending the original discoveries. Recoverable reserves in Block 15 are estimated to exceed 4.5 billion barrels of oil.

Development Planning

Development planning efforts began shortly after the first discoveries and were centered around two large hubs, which became known as Kizomba A and Kizomba B. Adjustments were made to accommodate new discoveries in the vicinity of the initial finds, with Kizomba A eventually developing the Hungo and Chocalho reservoirs and Kizomba B developing the Kissanje and Dikanza reservoirs. Xikomba, discovered in mid-1999, was a sufficient distance from the initial discoveries that a stand-alone development concept evolved.

The size of the Xikomba resource, approximately 100 million barrels, warranted a smaller development than either Kizomba A or B, each approximately 1 billion barrels. An Early Production System (EPS) was chosen as the appropriate development concept for Xikomba. This concept included a trading tanker converted into an FPSO, together with subsea hardware, to develop either large fields in advance of a permanent installation or smaller fields with reservoir uncertainty. Xikomba was the third of three sequential developments off West Africa matured under this concept, an application of the "Design One, Build Multiple" philosophy. See Figure 2.

The full field development plan for Xikomba required nine subsea wells—four production, four water injection, and one gas injection. To date, eight of these wells have been drilled and completed. The wells are tied back to the FPSO via a bow-mounted turret. The Xikomba topsides facilities are capable of processing 90,000 barrels of oil and handling 50,000 barrels of produced water and 95 million cubic feet of gas each day. Oil is stored on the FPSO, with offloading via a floating hose to standard trading tankers.