



OTC 19082

Espirito Santo: The New Deepwater Frontier in Brazil

Márcio Félix Carvalho Bezerra and Nery Vicente Milani De Rossi, Petrobras

Copyright 2007, Offshore Technology Conference

This paper was prepared for presentation at the 2007 Offshore Technology Conference held in Houston, Texas, U.S.A., 30 April–3 May 2007.

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

Petrobras has extensively acted in five simultaneous Exploration and Production frontiers in the Espirito Santo Basin, namely: gas in shallow water, light and heavy oil in deepwater, light oil in ultra deepwater and onshore.

The oil and natural gas production has increased very fast over the last years; thus, contributing to the sustainability of the Brazilian scenario.

The new projects planned will require solid investments from Petrobras, in the order of US\$ 9 billion up to 2011, applied mainly in the exploration and production areas.

The turning point in the oil production is starting with the new deepwater production systems in the following fields:

- Golfinho: (module 1 - FPSO Capixaba - 2006) and (module 2- FPSO Cidade de Vitoria -2007).
- Jubarte: phase 1 (FPSO P-34 - 2006) and phase 2 (FPSO P-57 - 2010).

In 2006, the oil production will increase from 30 for 90 Mbopd.

Natural gas is another example of success. Production is expected to rise from the current 1.3 million m³/d to about 20 million m³/d by the end of 2008.

In order to reach these goals, Petrobras has invested in new infrastructure projects such as pipelines, processing plants and in the construction of a new port to support offshore operations. The company has also participated in research projects in partnership with the Federal University of Espirito Santo. These actions will consolidate a new cycle in the petroleum industry in Espirito Santo, the new deepwater frontier in Brazil.

A Little Bit of History

The performance of Petrobras in Espirito Santo State, located in southeastern Brazil, encompasses activities in the

areas of the Espirito Santo Basin (onshore and offshore) and the north portion of the Campos Basin (offshore). The activities in the area initiated exactly 50 years ago (1957), with focus onshore, with the first discovery happening after a 10-year research period (1967). In 1968, in the Espirito Santo Basin, the first Brazilian offshore well was perforated (1-ESS-01), in shallow waters (WD 47 m). Also after 10 years of work (1978), the Cacao Field appeared as the first offshore commercial discovery in the Espirito Santo Basin, at a water depth of 19 meters.

The onshore production initiated in 1973, reached the top production of 25 Mbopd in 1984, declining down to 9 Mbopd in 1998, when new fields were discovered in function of new technologies (seismic 3D). During this period, new wells were perforated in shallow waters (60 meters), leading to the discovery of two new non-associated gas fields: Congoa (1988) and Peroa (1997).

In 1999, Petrobras started pursuing a new frontier in the area, perforating the first wildcat (1-ESS-90A) in deep waters. Hence, a new cycle begins.

In early 2001, the first commercial discovery took place in deep waters (Jubarte Field) in the north of the Campos Basin, followed by, in 2003, the discovery of light oil, also in deep waters, in the Espirito Santo Basin (Golfinho Field).

Oil and Gas Production - The Projects

• Jubarte Pole

The new cycle of production in Espirito Santo began with a two-month extended well test (EWT), transformed in a pilot production phase, in the Jubarte Field (WD 1300 m), located in the north part of the Campos Basin, off the coast of Espirito Santo State, having operated from oct/2002 to jan/2006, producing about 20 Mbopd, through FPSO Seillean. Dec/2006 saw the start of the operation of Phase 1 of the field development, through FPSO P-34, with a production capacity of 60 Mbpd. The beginning of operation of the Phase 2 is planned for 2010, with FPSO P-57, with capacity for 180 Mbopd, completing the development of the Jubarte Field.

Based on the answers from the EWT and the Pilot Phase, Petrobras decided to test several new technologies for heavy oil production: use of long horizontal wells to increase the production; settling of electrical submersible pump (ESP) installed on the seabed as the main artificial lift method and gas-lift as backup and the transformation of the FPSO P-34 process plant in an offshore full scale lab to process heavy oil.

Neighboring the Jubarte Field, the fields of Cachalote, Baleia Franca and Baleia Ana were discovered (WD 1500 m).