



OTC 18242

Albacora Leste Field Development—FPSO P-50 Systems and Facilities

F.E.N. Brandão, C.C.D. Henriques, L.B. Rende, L.C.R. de Barcellos, and C.R.B. de Oliveira, Petrobras

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

Petrobras has converted the VLCC tanker Felipe Camarão into FPSO P-50 in order to operate in the Albacora Leste field, Campos Basin, offshore Brazil. FPSO P-50 is one of Petrobras largest offshore platforms, with a processing capacity of 180,000 bopd, 6 million m³/d of gas and an injection capacity of 35,000 m³/d of water.

Based on Petrobras experience from the conversion of 10 other FPSOs/FSOs, in the last 10 years, the FPSO P-50 project was developed taking into account the concepts of operability, constructability, and modularity, which resulted in several improvements on the systems and facilities installed on board.

Some of the technical challenges involved in the FPSO P-50 project that will be addressed in this paper are listed below:

- Material Selection: detailed material selection analysis for the process plant due to the presence of CO₂ in the oil;
- Gas Compression: 3 x 2 million m³/d Centrifugal Moto-compressors, driven by Variable Speed Drivers;
- Gas Treatment: CO₂ removal plant;
- Injection System: Sulphate Removal Unit;
- Offloading systems: Double Discharge System with 2 Hydraulic hose reels installed at the bow and stern;
- Marine Systems: Use of ring-shaped pipe-racks and submerged cargo pumps;
- Chemical Injection System: Centralized filling and distribution system.

The main objective of this paper is to describe the technical challenges faced by the project team and the solutions adopted for the FPSO P-50 project.

INTRODUCTION

Albacora Leste Field

The Albacora Leste field was discovered in March 1986 by the wildcat 1-RJS-342A. This 600-km² field lies 125 kilometers off the coast of Rio de Janeiro, at water depths from 800 to 2,000 meters. The field is comprised primarily of Miocene turbidite sandstones (Reference 1).

The Field Development comprises 16 subsea production wells producing 180,000 bopd through individual bundles to FPSO P-50, located at a 1,240-meter water depth. The water injection, totalizing 35,000 cubic meters, will be achieved through 14 subsea wells.

After processing and treatment in the FPSO, the oil is stored inside the tanks and later exported to shore by dedicated shuttle tankers. The compressed gas is exported through a 10-inch gas pipeline up to a subsea Pipe Line End Manifold (PLAEM) that is connected to an existing fixed platform through a new 20-inch diameter pipeline. From this fixed platform, the gas is sent to shore through the existing Campos Basin gas network.

FPSO P-50

P-50 shown at Figure 1 is a former VLCC from Petrobras fleet that was converted to production from 2002 to 2005. The FPSO arrangement is modularized as shown at Figure 2, with separated modules for Gas Compression, Gas Treatment (De-hydration and CO₂ Removal), Crude Separation, Manifolds, Electrical Generation, Electrical Utilities, Non-Electrical Utilities, Water Injection & Sulphate Removal, Flare System, Pipe-racks, Offices&Control and Quarters. Construction of the modules was granted to four different Contractors. The ship conversion and the final modules Integration Contract was assigned to a fifth Contractor.

The objective here is not to give a full description of all P-50 systems, which would make this paper overly extensive, but rather to focus on some critical systems where lessons learnt from Petrobras previous projects (Reference 2) resulted into a modification in the concepts adopted. We will here focus on the FPSO process plant and utilities, since the FPSO Marine Systems and the ship conversion were already thoroughly discussed in a paper previously presented in OTC (Reference 3).