

The Brazilian Pre-Salt Petroleum System

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Abstract

The Early Cretaceous Syn- to Post-Rift Pre-Salt petroleum system of the Santos in Southeastern Brazil is already one of the most prolific petroleum systems of the world. It was discovered in 2006 from a pioneer well at Lula field and currently, it is producing more than 2.0 million boe/d and it has potential to triple this production over the next few years. The Brazilian pre-salt comprises huge accumulations underneath the salt layers of light oil with excellent quality and high commercial values. It is characterized by giant and supergiant fields and very high productivity performance. The average production per well is 15,000 bop/d and some wells produced over 60,000 boe/d in 2019. Three supergiant fields (> 5 Gboe) have been discovered in Santos Basin: Lula, Buzios and Mero fields. Lula field is presently the largest oil field in Brazil and it accounts for a production around 1 million bop/d. Buzios field production has just started and it has potential to surpass Lula Field production. Beyond these, several other giant fields occur in Santos Basin: Atapu, Itapu, Sepia, Berbigao, Sururu, Sapinhua and Lapa fields, currently under development or in the early stages of production. Not to mention other very promising potential discoveries that are expected to be announced soon in the areas that were awarded in the latest Brazilian Auctions. The pre-salt petroleum system comprises hydrocarbon generation in the Barremian shale of the Itapema Formation, and accumulation in the Aptian carbonate reservoirs, microbial and coquina rocks, buried at a depth that surpasses 5,000 m. The Pre-salt reservoirs show very specific and complex facies. Spherulite and schrebs (dedrolitic carbonate growth) facies are common. The source rock consists of lacustrine shales rich in organic matter deposited in the rift phase. The thick salt layers, that can reach up to 2,000 m, acts as an extremely competent seal. This paper aims to

present the Pre-Salt petroleum systems of Santos Basin by disclosing some details about Buzios field, discovered in 2010 by 2-ANP-1-RJS well, drilled by Petrobras in partnership with the National Agency of Petroleum, Natural Gas and Biofuels (ANP). Buzios field is sitting over a structural trap of about 400 km² closure at the Aptian top reservoirs level presenting a maximum oil column that can reach up to 400 m with VoIP greater than 36 Gboe.