

LONGÁ FORMATION AS GAS PRODUCER RESERVOIR: STATE OF ART

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ABSTRACT: The advance of the geological knowledge obtained by ENEVA-PGNSA through the drilling of more than one hundred wells on its massive exploratory campaign, demonstrated the potential of the Longá Formation as a possible new exploratory play. Historically, Longá Formation is characterized by the presence of dark gray to black shales with intercalations of siltstones and sandstones in its middle part. Some authors suggest that could play a role as a source or seal rock in the Parnaíba Basin petroleum system. Geological descriptions and interpretations of well logs performed in the central portion of the basin characterize the Longá Formation lithotypes as intercalations of fine to very fine sandstones with siltstones. With the objective of evaluate the production potential of these reservoirs, a well was drilled and whole-core, conventional and nuclear magnetic resonance (NMR) logs were acquired for laboratory and petrophysical studies. The laboratory studies included the petrographic description of plugs and thin sections, basic petrophysics, x-ray diffraction, capillary pressure by mercury injection and porous plate, electrical properties, nuclear magnetic resonance and rock mechanics. The conventional logs did not show the classic signature of the known reservoirs in the Parnaíba Basin, only small areas showed the density-neutron crossover that typically characterize sandstones. Also, the resistivity presented anomalously low values associated with the presence of conductive minerals. Laminated reservoirs represent great challenges for formation evaluation studies, especially in the presence of the silt fraction. The lower the vertical resolution of the geophysical logging tools, the greater the difficulty in distinguish the laminations. Another factor that increases complexity is the mode of distribution of the silt fraction, which can be laminated and or dispersed. In this context, the NMR logs proved to be a vital tool since it showed the presence of free-fluid and effective porosity in this type of reservoir. The results of the core-log integration studies confirmed the potential of Longá Formation as reservoir producer. The petrophysical results presented variation of porosity between 2% and 23%, permeabilities of 0.001 mD to 54 mD and average irreducible water saturation of 55%. The production potential of Longá Formation was confirmed in a well test. After the stimulation there was an increase in the gas flow rate of approximately 500%. The results of the present work open a new exploratory horizon in the Parnaíba Basin, confirming the presence of laminated sands reservoir in a stratigraphic interval with wide distribution and great potential of production.

KEYWORDS: PARNAÍBA BASIN, LONGÁ FORMATION, GAS RESERVOIR, LAMINATED RESERVOIR.