

## **The Miocene Porquero Formation in the Lower Magdalena Valley basin of NW Colombia: from bypassed pay to four producing gas fields in 5 years.**

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The Miocene Porquero Formation in the Lower Magdalena Valley basin of NW Colombia is a thick (3400 Ft) marine shale that has historically been viewed as a regional top seal and potential source rock. There have been some gas shows and limited production in the adjacent Plato sub-basin, but sandstones within the thick shale in the San Jorge sub-basin have generally been regarded as poor-quality reservoirs.

The Porquero potential in the San Jorge sub-basin was identified by apparent bypassed gas pay in sandstones in two wells drilled in the Nelson gas field by Shona Energy, a company acquired by Canacol Energy in 2012. Those wells had the deeper Cienaga de Oro Formation as a main target. The analysis of gas shows, logs, and drill cuttings suggested the presence of 80 Ft of potential bypassed gas pay in the Porquero. This concept was tested by temporarily shutting in production from the deeper CDO reservoir in a well and testing the Porquero. The Porquero sandstone tested 13 MMscfgpd with no water. Following this proof of productive capability, a dedicated Porquero exploration well was drilled in the Nelson Field. It encountered 39 Ft of net pay with 19% porosity and produced 23 MMscfgpd of gas per day (4035 boed). Subsequent exploration wells discovered the adjacent Toronja, Arandala and Breva gas fields.

The main interval of interest in Porquero is interpreted to have been deposited during a sea level lowstand, leaving shallow marine shoreface sandstones encased in marine shale. The productive interval is characterized by good quality sandstones with an average porosity of 25% and an average water saturation of 45%. The sandstone reservoir exhibits low resistivity, making petrophysical interpretation challenging, particularly in legacy wells with older wireline log suites. Modern wireline log suites acquired in the wells have allowed calibration of seismic attributes and enable us to confidently map the distribution of gas-bearing sandstones on 3D seismic. Mapping indicates that gas is trapped in both structural and stratigraphic traps.

The Middle Porquero Formation play in this area has rapidly evolved from bypassed pay identified in a deeper pool well in 2015 to four producing gas fields today. Cumulative production is 9 BCF and proven resource from 73 BCF OGIP. Further exploration potential in the area is indicated by additional AVO anomalies.

### **Theory / Method / Workflow**

### **Results, Observations, Conclusions**

### **Novel/Additive Information**

### **Acknowledgements**

### **References**

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