Tectonic Influence in Trap Generation during the Early Eocene, Talara Forearc Basin, NW Perú: A case study of the Mogollón Formation

J.LEYVA ORE & J.DAUDT
Petrobras Energía del Perú (Pecom Energía).
Amador Merino Reyna 285 / Piso 5
San Isidro, Lima, Peru
e-mail: jleyva@petrobrasenergia.com
jdaudt@petrobrasenergia.com

ABSTRACT

The Mogollon Formation represents one of the most important productive reservoir in the Lower Eocene of the Talara basin, northwest Peru, having accumulated almost 300 millions barrels since 1910. From a sedimentological point of view, transgressive deltas, alluvial fans, deltas and braided fluvial systems are interpreted from base to top.

A complete geological overview was carried out, targeting the evaluation of the development and exploratory potential of blocks X and XVI. Well data, integrated in regional cross sections, were the base of the interpretations. The integration of production and seismic data has allowed, in some areas, the calibration of the interpretation based on electrical logs. A complex fault interaction is observed, which gives some indication of how the trapping mechanism has evolved during periods of high and low tectonic activity.

Basically we interpret two main traps styles: a) sand-conglomerate bodies which were subsequently tilted by tectonic activity, and where the hydrocarbon potential is higher in positions close to the back of master faults, and b) where regional listric faults have triggered rotational features (rollovers) in the hanging wall, increasing the frequency of small subordinate faults located at or near the top of the deformed structure. Consequently, productivity increases due to an improvement in the original reservoir permeability. In both cases, the final recovery is better than in other situations as for instance, in wells drilled on the flanks of rollover structures.

INTRODUCTION

The Talara Basin is located in the Northwest part of Peru and has been producing oil for almost 125 years. Talara is classified as a forearc basin (Carozzi & Palomino, 1993) and, despite forearc basins are not normally very profitable in terms of hydrocarbon potential, the total production has already reached more than 1.5 billion barrels since 1880.

In 1996, Perez Companc, by that time an argentinian based oil company (now called Petrobras Energía), took over Blocks X and XVI (Figure 1), during the second bidding round which was held in Peru. Since then, new approaches were used in order to identify the main trap characteristics and to quantify the development and exploratory remaining potential.

The object of this study, the Mogollon Formation, is one of the main reservoir regarding EUR (Estimated Ultimate Recovery). It is a 600m thick siliciclastic deposits made of transgressive deltas, alluvial fans, deltas and braided fluvial systems, from the base to top (Daudt et al. 2001), deposited during the Lower Eocene (Ypresian). As a rule, the Mogollon reservoir is characterized by poor quality in terms of petrophysic. The average porosity is ranging from 4% to 6% and the permeability between 0.05 to 1 mD. Fractures, rather than matrix quality, are believed to play an important role in increasing the reservoir productivity.

Figure 1. Location Map of the Talara forearc basin.