

The Challenge of Producing Thin Oil Rims in Trinidad

Jill Marcelle-De Silva and Richard A. Dawe

ABSTRACT

Many hydrocarbon reservoirs have water underlying an oil or gas bearing zone. When placed on production, if a wellbore draws oil or gas from an area near the water zone, the water can be drawn into the wellbore due to the phenomenon of coning. This creates problems because it results in excessive water production compared to the oil or gas production. If the water contains salts such as sodium chloride, these can corrode production facilities, and the produced fluids must be separated before transporting to the refinery. Reduced oil or gas production and increased operating expenses all lead to reduced revenue. Unfortunately, such a situation cannot be avoided if there is a thin oil-bearing layer, sandwiched between a gas cap and bottom or edge water, and in which case gas coning can also occur. Thin oil rims are found in many oil provinces around the world and are especially prominent in the prolific gas province offshore the east coast of Trinidad and Tobago. While oil, the more valuable resource is recovered before extraction of overlying gas, exploitation of these reservoirs poses a challenge for reservoir development, as early gas and water coning severely hinder maximum oil recovery. Alleviating these challenges by reservoir management involves knowing where the fluid contacts are, and optimisation of well placement and fluid withdrawal rates. This paper investigates the problems of thin oil rim reservoirs. It discusses the successful current reservoir management practices for coning carried out in Trinidad within the economic restraints of the liquefied natural gas (LNG) contracts, and demonstrates how multidisciplinary teams, using horizontal wells and good use of modern technology, have successfully exploited the fields off the east coast of Trinidad.

Keywords: Thin oil rim, horizontal well, coning, multilateral well, water breakthrough, water production, Trinidad