SEAPEX Exploration Conference 2005
Orchard Hotel, Singapore
5th – 7th April 2005

ABSTRACT

Author(s) : John Booth
Company Affiliation : NuCoastal, APICO and Auldana Advisors

Khorat Plateau Basin, NE Thailand, Discoveries and Future Exploration Potential

Esso established commercial gas production in the Khorat Plateau Basin when their Nam Phong field came on stream in 1990, supplying a dedicated power plant. Since then they have produced some 325 Bcf of gas and have an estimated 65 Bcf of remaining recoverable reserves. The reservoir for this field is a Permian age platform carbonate (the Pha Nok Khao formation). These carbonates are generally of low porosity, with a field wide average of only 2% to 2.5% effective porosity. However, there is clearly an extensive fracture network, as the field has being drained with only 8 production wells (one currently shut in) and, without any compression, has already recovered some 70% of the GIIP.

Recently (2003-2004) 3 appraisal wells were drilled on the Phu Horn gas field, which had been discovered by Esso in 1983 and also has a Permian platform carbonate reservoir. These wells were drilled underbalanced, with spectacular increases in production rates – the PH-1 well produced only 4 mmscfgd, whilst the recent wells have all been long term tested in excess of 30 mmscfgd. This appraisal of the central portion of the field has proved sufficient reserves to bring the power plant back up to full generating capacity and sustain this rate for the entire contract life. The field is scheduled to come on stream in mid 2006.

Depending on your point of view, the recent success of the Phu Horn appraisal drilling has either simply confirmed the commerciality of a discovery made 20 years ago and has no implications for the current exploration potential of the rest of the basin, or you are an explorer ……. This paper is aimed at the latter mindset.

There is a proven hydrocarbon system in the basin that has charged Permian reservoirs with gas. The critical elements of this hydrocarbon system are the distribution and nature the Permian carbonates, the source of the gas and the timing of gas generation verses trap formation. The interplay of these critical elements that combine to make exploration plays in various parts of the basin are illustrated by a series of seismic sections.

Although the Permian carbonates are the only proven productive reservoir there are several other potential targets within the basin, including fractured “basement”, Upper Carboniferous mixed carbonates and clastics, Triassic clastics and Jurassic sandstones. Seismic sections also illustrate plays in these reservoirs.

There remains the intriguing potential for oil in this basin. Whilst it is perceived as gas prone, and very dry gas with almost no CO_2 at that, oil seeps are known around the northeastern edge of the basin in Laos, oil staining has been found in sandstones on the western flank of the basin in Thailand and oil shows whilst drilling have confirmed at least one palaeo-oil field in the subsurface. All of these appear to be related to Triassic source rocks. Exposures of the Triassic along the western flank of the basin contain hundreds of meters of lacustrine shales, with organic contents as high as 32%.