

## Upgrading Small Discoveries – Cases From Taranaki Basin, New Zealand''

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### ABSTRACT

India has recently awarded production contracts over several dozen small undeveloped oil and gas discoveries to new ventures in the expectation that more entrepreneurial approaches will lead to valuable economic outcomes. Several fields within several plays in the Taranaki Basin, New Zealand, illustrate that fresh approaches, new technologies and concepts, and often some good fortune can indeed combine to transform discoveries initially appraised as uneconomic, or not recognised at all, into significant and lucrative producing assets.

The main commercial play in the Taranaki Basin, gas-condensate in Eocene paralic sandstone reservoirs, was established by the discovery of the Kapuni Field in 1959. Now the 3rd-largest field in the basin with expected ultimate recovery of 1.36 trillion cubic feet of gas and 67 million barrels of condensate, the first analogous prospect to be drilled following the Kapuni discovery was the Mangahewa anticline about 40km to the north, in 1961. The result was disappointing, with inferior reservoir quality attributed to the greater depth of the reservoir level. The discovery was not further appraised until the late 1990's when a second well established commercial flow from a 20m sandstone with better reservoir properties, and with hydraulic fracturing of some tighter sands as well. Mangahewa Field has since experienced several stages of development, with current production in excess of 60 million standard cubic feet of gas and 2000 barrels of condensate per day.

Two further fields have been brought into production on the northern (Turangi) and western (Kowhai) flanks of the Mangahewa field, since 2006. Combined, the expected ultimate recovery from the three fields is over 800 billion cubic feet of gas and 29 million barrels of condensate.

The first commercial oil field in New Zealand was discovered at McKee, in alate Eocene paralic sandstone reservoir on a tight thrust-faulted anticline in the eastern onshore Taranaki Basin, in 1980. Exploration southward along the trend directed at the same reservoir target made some sub-commercial gas-condensate discoveries. In one of these, Waihapa (1987), oil shows and severe mud losses suggested an oil reservoir in fractured, late Oligocene-early Miocene Tikorangi limestone, subsequently proven a lucrative reservoir which has produced 24 million barrels of oil.

Another case of unanticipated discovery of oil in a younger reservoir formation occurred at much the same time, at Kaimiro, which had made a minor gas-condensate discovery in the Eocene Kapuni sandstone. The subsequent recognition and testing of oil in late Miocene thin-bedded deep water sands launched the Mount Messenger play, which to date includes six producing fields with combined expected ultimate recovery of about 17 million barrels of oil.

Careful re-evaluation of small, and in some cases sub-commercial oil and gas discoveries in Taranaki Basin has identified important previously unrecognised reservoir plays and stimulated further discoveries and developments, sustaining the growth of New Zealand's oil and gas industry.