Article

The monetary value of natural gas condensate: a New Zealand perspective

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Introduction

I have recently[1] been examining the published condensate yields of a number of gas fields, in particular in Kazakhstan and in the North Sea. In this article I wish to perform a similar analysis for a source of natural gas in New Zealand. I go on to argue that the same analytical results in numerical terms for a gas field, say in the US, would be viewed and acted upon differently there from in New Zealand. My choice of 'source of natural gas in New Zealand' is the Cardiff-3 well in Taranaki, recently spudded in and therefore not yet producing. Resources there are quoted as 160 billion cubic feet of natural gas and 5.49 million barrels of condensate.[2] The operator is TAG Oil and, spudding having been completed, the drill tube of a narrower diameter than that close to the surface is being installed. The accompanying illustration[2] shows the drill tube at Cardiff-3 awaiting well installation.

Drill tube for use at Cardiff-3. Image reproduced with permission from TAG Oil Ltd.[2]

Calculations

Unlike oil or coal, natural gas is sold on a heat basis, not on a quantity basis. A widely used benchmark price is the Henry Hub price which, at the time of writing this article, is $US3.62 per million BTU (British Thermal Units) of heat. One million BTU is equivalent to 1.06 GJ. Using a value of 37.5 MJ m^{-3} for the calorific value, the gas at Cardiff-3 is therefore worth:

$[(160 \times 10^9\ ft^3 \times 0.028\ m^3 ft^{-3} \times 37.5\ MJ\ m^{-3} \times 10^{-3}\ GJ\ MJ^{-1}) \div 1.06]$ million BTU × $US3.62 per million BTU = $US573 million at present-day prices.

There appears to be no widely accepted benchmark price for natural gas condensate. It often seems to attract the same price as low-sulfur light crude and to be bracketed with it for pricing purposes. For example, prices of about $100 for crude and condensate, by 2013 reckoning, are given without distinction between the two.[3] The condensate at Cardiff-3 is therefore worth about $US549 million. This is about 4% lower than the value of the gas and, having regard to approximations made and uncertainties in future prices and trends, we can cautiously conclude that the gas and the condensate at that particular source have approximately the same monetary value.

Discussion

As previously pointed out,[1] internationally there are fields where the condensate significantly exceeds the gas in financial value. At the Cardiff-3 well it will be about 50:50 according to the above calculations. It has also been pointed out that crude and condensate are sometimes considered jointly (although OPEC does not recognise any equivalence of one to the other), so to compare Cardiff-3 with an oil well having major amounts of associated gas would be reasonable – there are many such around the world. More importantly, the monetary value of a particular source or supply of natural gas is less of a 'hard number' than the price of a barrel of oil. A sufficiently interested reader can show, by converting a benchmark price for oil (OPEC, NYMEX, Brent) to units of $US per million BTU and comparing that with Henry Hub, that unit heat from natural gas is worth only something like a fifth of unit heat from oil. This has been so over the history of the industry and is a major factor in there having been so much flaring of natural gas. This is now largely prohibited for GHG emission reasons, and has been replaced by reinjection of unwanted gas into the well after separation from the oil with which it was 'associated'.

New Zealand is still a long way from being self-sufficient in hydrocarbons, so thrift in the use of her reserves is required. In a country where hydrocarbons are more abundant,a case for treating a particular quantity of natural gas as being of negligible worth could be made much more easily than it could in New Zealand. Price comparisons like the above for Cardiff-3 based on US experience, therefore, have to be modified conceptually for the conditions prevailing in New Zealand. One consequence of the superfluity of natural gas in some parts of the world is that it can be made available at very low prices to refineries, keeping down refining costs. The only refinery in New Zealand is that at Marsden Point. This has a capacity of just under 0.1 million barrels of oil per day, making it a small refinery in world terms. I do not know the extent of natural gas usage at Marsden Point or where the gas is sourced, but quantities of gas which in other regimes might have been seen as hardly worth collecting would meet the energy requirements there.

Concluding remarks

I recall that not many years ago Air New Zealand was interested in biodiesels as jet fuel and that some related research was carried out. To get jet fuel from condensate is of course straightforward, and countries producing jet fuel in this way include the UAE. I note that Marsden Point is set up for condensate refining as well as for oil refining. That aviation as well as the 'motoring public' stand to gain from expansion of activity in condensate production and refining in New Zealand is clear.

References

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3. http://crudemarketing.chevron.com/posted_pricing_daily_california.asp (accessed 01/11/13).