

Sampling of mud gas using Isotubes in NW Borneo deepwater

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Isotube sampling of mud gas was first introduced by SMEP in 2001 during the drilling of deepwater wells Ramin-1 and Ubah-1. It proved to be a cheap and reliable means of obtaining gas data throughout the complete stratigraphy, from the mud returns. This enables a better understanding of the retention and hydrocarbon migration mechanism with respect to regional and local seals and possible fault conduits.

The Isotube technique has since been adopted as a standard well practice in SMEP deepwater exploration. To date, six deepwater wells across NW Borneo have been studied. The benefit from this method is briefly discussed.

The key advantages of the Isotube sampling are:

- acquisition of mud gas information to complement the PVT dataset
- provision of a back-up to PVT study in case of aborted PVT sampling
- continuous gas sampling throughout the stratigraphy

The relatively low cost makes it possible to acquire a continuous log of gas composition with depth. In non-reservoir sections, a 90 ft interval is used. In objective reservoir sections, a 30 ft interval is preferred. This provides a good means to understand the plumbing system of the deepwater hydrocarbon habitat. Abrupt changes in gas composition and major jumps in gas maturity indicate presence of effective seals. Minor step changes imply weaker retention capacity from partial or local seals. A gradual variation means a very leaky overburden hence very poor top seal capacity. Correlation between wells further helps to distinguish major regional seals from the local ones.

It has been acknowledged that Isotube samples tend to capture the lighter (more volatile hence movable) hydrocarbons compared with the PVT samples that represent a more complete compositional range. It must also be noted that Isotubes are by no means a possible replacement for standard PVT studies.