TG16

The Evolution of Subsurface Data Acquisition Strategies of an Exploration Company Searching for Gas in Palaeozoic Format

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SUMMARY

Specific data acquisition strategies have been developed to address the challenges of deep wells in tight reservoirs in remote and harsh environments.

Advanced Mud Logging technologies have helped SRAK to gain trust in mud logging data sets to such an extent that this technology is now the prime source of information for certain datasets. Comparison of mass spectrometer derived mud gas data with downhole sampled gas has shown a very good compositional match.

The targeted use of Logging While Drilling has been a successful strategy. In tight gas reservoirs that are typically drilled with high overbalance, it is difficult to obtain high quality data before invasion occurs. The high overbalance often results in deep invasion that may lead to underestimation of gas and other hydrocarbons. The use of LWD could also be used for fluid typing and as a permeability indicator when used in several time-steps across the same interval.

This talk will also show how SRAK's decision to core both reservoir and non-reservoir facies rocks has helped to integrate all available data, from gas samples to core plugs, to come up with relevant conclusions on charge history and migration paths.

The South Rub Al-Khali Company Limited (SRAK) is an incorporated Joint Venture formed by Shell Saudi Ventures Limited (50% share) and Saudi Arabian Oil Company (50% share) to explore for non-associated gas and associated liquids in the South Rub' Al-Khali Basin in the Kingdom of Saudi Arabia.

Between 2006 and 2007 three exploration wells have been drilled in SRAK's Contract Area 2, all of which penetrated deep and tight Ordovician formations as one of their primary reservoir targets.

Specific data acquisition strategies have been developed to address the challenges of deep wells in tight reservoirs in remote and harsh environments. While drilling these three wells SRAK has gone through a very steep learning curve with respect to well data acquisition and integration. The initial approach that guaranteed multiple levels of data redundancy paid in providing unambiguous evaluation results. It also allowed optimising the data acquisition strategy for the current and future wells that SRAK is drilling.

Repeated application of Advanced Mud Logging technologies has helped SRAK to gain trust in mud logging data sets to such an extent that this technology is now the prime source of information for certain datasets. Comparison of mass spectrometer derived mud gas data with drill stem test separator and bottom hole gas samples have shown a very good compositional match. Similarly, downhole fluid sampler data was in excellent alignment with the advanced mud gas data.

Despite the added costs and perceived risks, the targeted use of Logging While Drilling (LWD) has been a successful strategy for SRAK as well. In tight gas reservoirs that are typically drilled with high overbalance, it is difficult to obtain high quality data before invasion occurs. The high overbalance often results in deep invasion that may lead to underestimation of gas and other hydrocarbons. The use of LWD could also be used for fluid typing and as a permeability indicator when used in several time-steps across the same interval.

As a final example, this talk will also show how SRAK's decision to core both reservoir and non-reservoir facies rocks has helped to integrate all available data, from gas samples to core plugs, to come up with relevant conclusions on charge history and migration paths.