

Operator Identifies and Eliminates Artificially-Generated Alkanes from Surface Gas Measurements While Drilling

PureFlex service delivers improved reservoir fluid characterization in challenging application

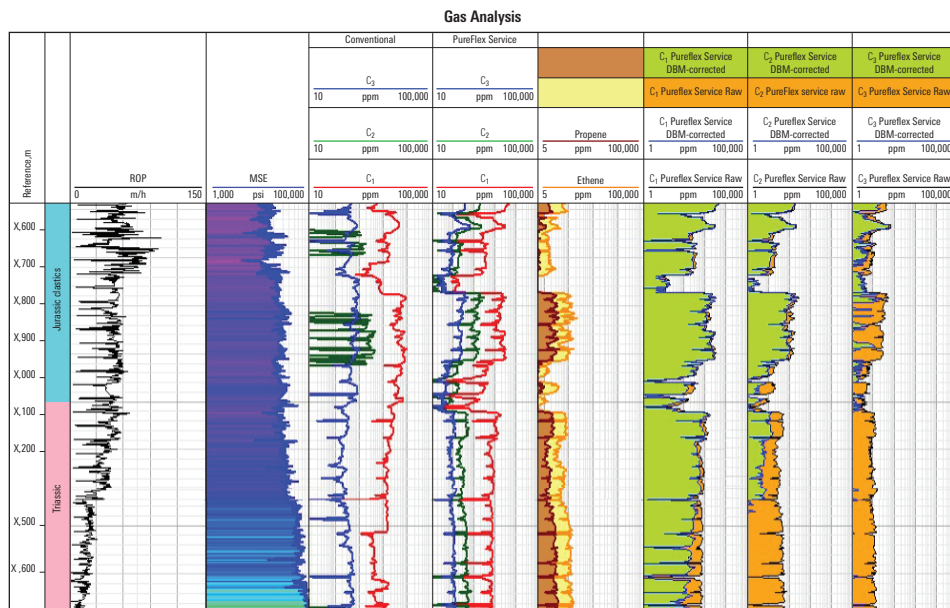
An operator drilled a development well through Jurassic and Triassic formations that posed challenges for traditional gas analyzers because low ROP intervals can generate drillbit metamorphism (DBM) that impacts results. PureFlex* surface fluids logging while-drilling service identified and eliminated artificial alkenes and alkanes in the C₁–C₅ range generated where DBM was more pronounced. Data acquired provided accurate characterizations of the formation fluids.

Reduce drilling costs using more accurate gas measurements

An operator in the Caspian region planned an onshore development well through Jurassic and Triassic formations with the objective to reduce drilling costs by deriving deeper formation porosity logs from mud gas in real time, for which a more reliable and accurate gas measurement was required. Current mud gas systems are ineffective while drilling low ROP intervals because drilling artifacts from DBM generate artificial light alkenes and alkanes that can introduce a high level of uncertainty.

Differentiate between true formation gas and artificially generated fractions

Geoservices, a Schlumberger company, recommended the PureFlex surface fluids logging while-drilling service—an advanced gas analyzer that is more accurate and reliable. The gas analyzer integrates a polar-contamination-free fast-gas chromatograph that measures traditional C₁ to C₅ alkanes plus a dedicated module measuring the light alkenes generated by the DBM, thus removing their undesirable effect on true formation alkanes measurement and enabling a better delineation of the C₁–C₅ logs. Further, the use of a novel algorithm eliminates the contribution of artificially generated alkanes that generally occur when severe DBM is present. This dramatically improves the quality of mud gas data.



The PureFlex service identified and removed DBM-generated alkanes from the reservoir fluid signal as ROP gradually decreased, providing a more realistic image of the gas levels measured at surface and therefore of the saturation in the formation.

Used surface fluids logging while drilling to more accurately characterize reservoir fluid

Run on multiple test wells before the target well to demonstrate the quality of data versus a conventional gas system, PureFlex service better separated and performed continuous measurement of the C₁–C₂ species, even in extreme cases where the ratio amongst the two went above 1,000. This resulted in improved characterization of the reservoir fluid.

The expected presence of light alkenes (ethene and propene) was observed in all the wells where the ROP started to gradually decrease and their DBM effect removed from the light alkanes. The algorithm enabled identifying and eliminate the artificial alkanes in the C₁–C₅ range generated in the intervals where the DBM was more pronounced. In some intervals it was demonstrated that the whole gas recorded was artificial.

Overall, the data achieved with PureFlex service provided a more realistic image of the gas levels measured at surface and therefore of the saturation in the formation, and a better characterization of the reservoir fluid composition.

Consequently, the operator decided to use PureFlex service in the more challenging area of the same field, where specific formation's petrophysical properties render traditional downhole tools ineffective.