

**Application of Advanced Mud Gas
Analytics for Reservoir Evaluation
and Optimizing Completion Efforts**

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Modern well site geology often includes the use of a mass spectrometer for detection of various components in the continuous mud gases while drilling. With this comprehensive data set comes the need for advanced analytics which can provide a cost effective science tool for reservoir evaluation and augmenting completion designs. This data set and analysis is useful in most mud systems and both vertical and lateral drilling operations. Especially useful in diesel-based mud systems, the mass spectrometer can differentiate the reservoir fluids from the mud additives. Vertical data applications include identifying fluid contacts, bulk porosity, stacked pay potential, and endorsement for lateral placement. Lateral data applications include finding evidence for compartmentalization, compositional variations, “sweet spots”, and secondary poro/permeability features. Zones of elevated water saturation and hydrocarbon depletion can also be indicated from appropriate data treatments. The mass spectrometer data set, when analyzed and presented appropriately, provides information to improve production as well as failure avoidance.

