

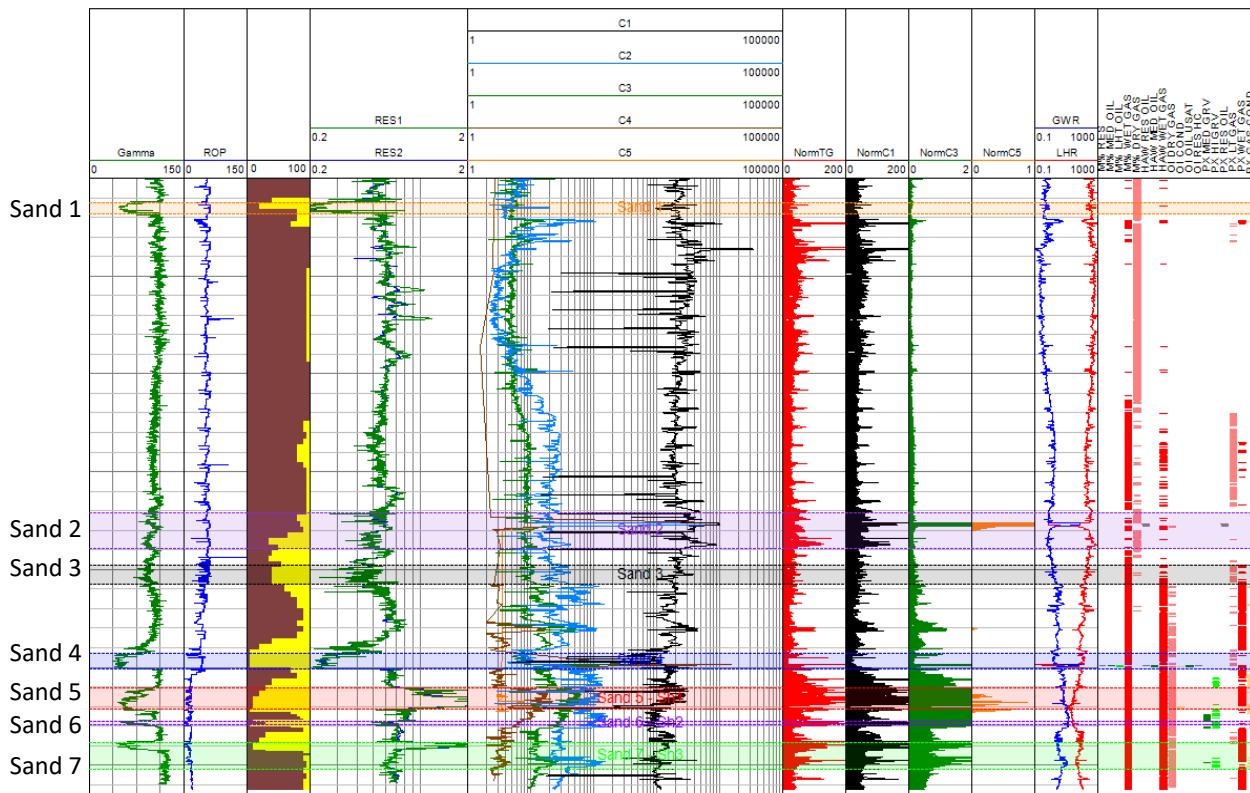


Reservoir Compartmentalization

Gas Analysis Case History

Issue Summary

An offshore operator, drilling thin sandstone beds in the Gulf of Mexico, required realtime overview of the hydrocarbon potential and possible compartmentalization of the drilled formations. Resistivity and gamma ray logs could be used to select the beds with reasonable precision but not fluid typing beyond indications of hydrocarbon or water as shown by the resistivity curve responses.



Issue Solution

Using realtime gas chromatography DWL was able to plot normalized gas values and ratios that allowed a quick look at the hydrocarbon potential. In the section illustrated, a combination of ratios indicate light hydrocarbons throughout – gas – but with liquid hydrocarbons appearing in the bottom three selected beds.

To investigate compartmentalization or connectivity cross plotting was used.





Reservoir Compartmentalization

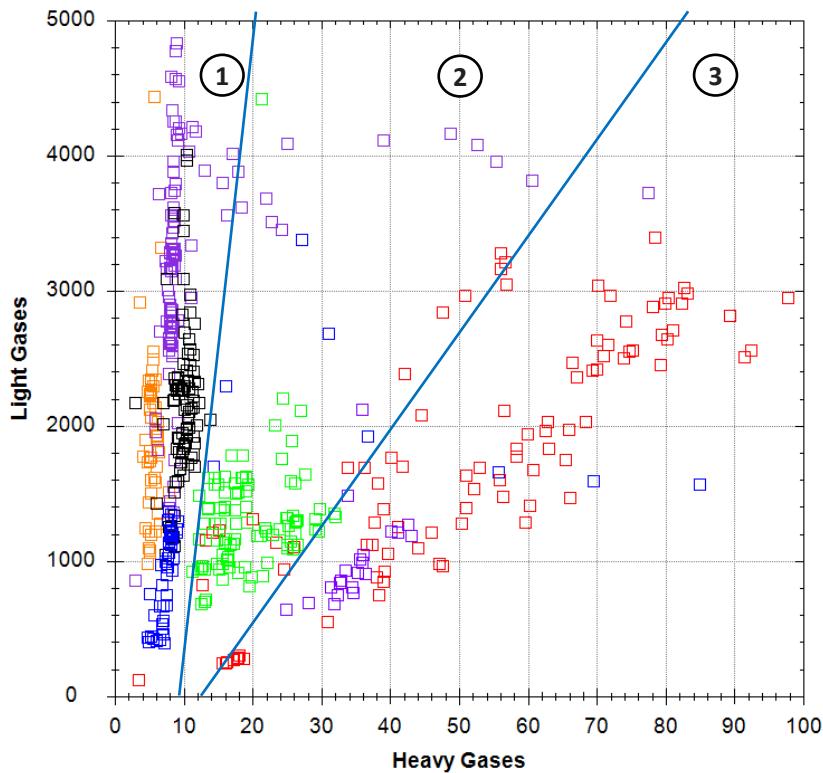
Gas Analysis Case History

Compartmentalization Overview

By cross-plotting alkanes DWL was able to show which sands showed similar or different gas signatures. The plot below uses light gases on the Y-axis and heavy gases on the X-axis. Three distinct trends are seen:

- Zone 1: Sands 1 to 4 – Light gas and all have water indicated by the resistivity.
- Zone 2: Sand 7 – Light gas in the sandier part with heavier gas in the clay-rich part.
- Zone 3: Sands 5 and 6 – Heaviest hydrocarbon composition.

This data points to clear differences in composition, which can aid in selecting the optimal formations for further investigation and production potential.



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