

API Gravity from Advanced Gas Analysis

We provide near real-time, continuous fluid composition and API Gravity readings directly from advanced mud gas logging. Our advanced systems analyze hydrocarbon gas compositions of C1-C8 liberated from the drilling mud stream at the surface. This translates the gas signature into a Pressure-Volume-Temperature (PVT) composition report, bridging the gap before traditional lab results arrive. A model is created to predict future API Gravity values on new wells. In published Kuwait case studies, predicted API gravity matched offset PVT references to within 0.2° API in the Middle Marrat formation (SPWLA-2025-0028).

Core Benefits

- **Optimized Well Completion:** Data identifies the most promising production intervals for completion and testing.
- **Rapid Decision Making:** Continuous data enables immediate reservoir management and geosteering adjustments while drilling.
- **Fluid Characterization:** Provides high-fidelity fluid identification and helps define formation zonation, vertical flow barriers, and hydrocarbon type (thermogenic vs. biogenic).
- **Risk Mitigation:** Offers a crucial source of formation evaluation data when wireline operations are impossible due to borehole instability or other complications.

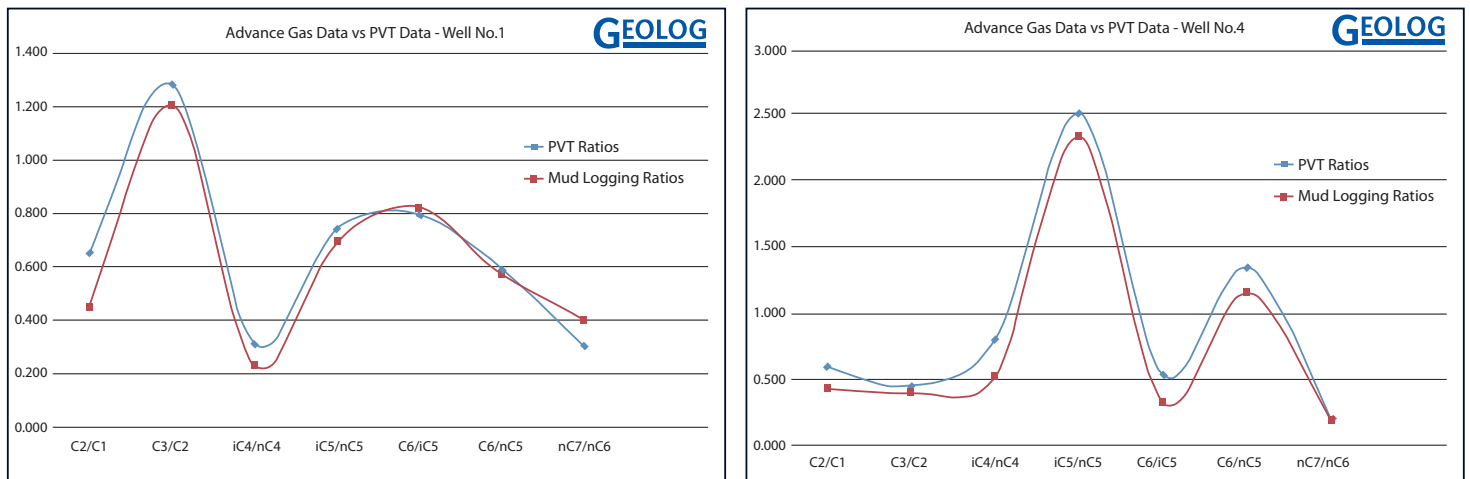


Figure 1. Fluid properties and Ratios from ML Advanced Gas Analysis are Matching with the PVT results:

- 2 Oil sampled wells (Well No.1, Well No.4)
- Oil in Well No.4 is highly Biodegraded

Our advantage

Most development wells today are drilled horizontally, making downhole PVT sampling difficult, time-consuming and risky, and in tight, HPHT or high-H₂S reservoirs, sampling programs are often cancelled altogether. Our real-time gas analysis determines production intervals and predicts API gravity from surface gas alone. See Figure 1 for the composition match and Figure 2 for predicted vs measured API gravity.

You already have basic mud gas analysis. Why not upgrade your "guesstimate" to a definitive, real-time API Gravity prediction from our G8 solution?

Technical Paper References



Realtime mud gas analysis: optimizing well completion, fluid composition predictions, and comparison with pvt data in tight carbonate reservoir – West Kuwait
 Ahmad Shoeibi¹, Jumah Meshael², Al-Mutairi Nami², Al-Wadi Meshal Abdul Hameed², Justin Fernandes¹ and Oswaldo Klinger¹ - ¹Geolog International, ²Kuwait Oil Company

Challenge

Two wells targeting the Jurassic Najmah, Sargelu and Middle Marrat formations in West Kuwait, tight HPHT carbonates with 20–35% H₂S, where borehole instability forced the cancellation of downhole logging and sampling. Production intervals had to be selected without wireline data.

Solution

GEOLOG's G8 and Geol isotopes Advanced Gas services provided continuous fluid typing while drilling. A field-calibrated compositional model transformed quality-controlled mud gas data (C1–C8) into PVT-range fluid composition and predicted API gravity, in near real time.

Results

Completion design based on mud gas data alone delivered the highest oil production in the field. Across 13 analysis stations in the two wells, predicted API gravity tracked the nearest offset PVT reference, within 0.2° in the Middle Marrat target at every station, while the offset references themselves vary by over 3° API across the field.

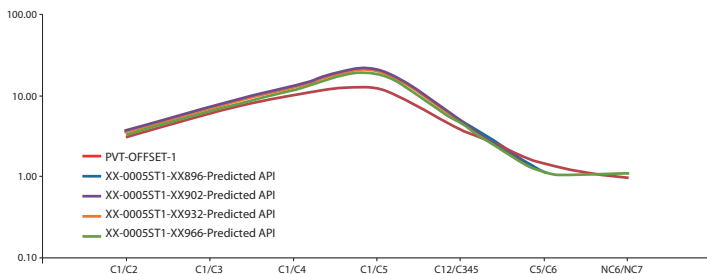


Figure 2. Well in Najmah formation (Mud gas data ratio vs PVT flash data and Predicted API table)

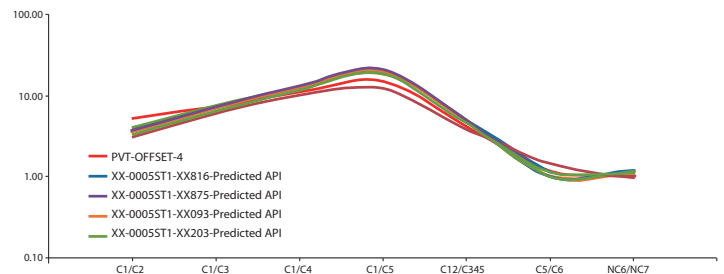


Figure 3. Well in Najmah formation (Mud gas data ratio vs PVT flash data and Predicted API table)

	PVT Offset-1	PVT Offset-2	XX-0008-XX251-Predicted API	XX-0008-XX547-Predicted API	xx-0008-XX612-Predicted API	XX-0008-XX725-Predicted API
API	45.7	42.5	39.4	40.2	38.6	39.4

	PVT Offset-1	PVT Offset-2	PVT Offset-3	PVT Offset-4	XX-0005ST1-XX816-Predicted API	XX-0005ST1-XX875-Predicted API	XX-0005ST1-XX093-Predicted API	XX-0005ST1-XX203-Predicted API
API	44.5	44.5	42.5	41.0	40.8	40.8	40.8	41.0

In this case study, our model achieves **92% agreement** with offset PVT, with predicted API gravity staying within only a few degrees of the reference values, delivering decision-ready API insight from surface gas alone, without downhole sampling.