Aspen Geolog™ Formation Evaluation for Unconventional Shale Plays

Improved recovery at lower cost

Formation evaluation has an important role to play in the development of shale plays. To determine in situ formation properties, the wireline (and LWD) logging tools developed for use in conventional reservoirs are run in wells in unconventional prospects. As with conventional reservoirs, calibration of logging measurements to measurements on core samples from the reservoir is essential.

The Aspen Geolog formation evaluation system uses modern well logs to produce superior results when characterizing unconventional reservoirs. A tremendous amount of important information can be derived from the integrated analysis of wellbore data, including mineralogy, TOC/maturity, mechanical rock properties, pore pressure, and other petrophysical properties.

Key Benefits

- Vendor-agnostic solution allows the processing and interpretation of any vendor's data
- Generate a full characterization of a shale play and identify sweet spots
- Understanding shale behavior helps improve recovery and reduce exploitation costs
- The ability to accurately characterize, model and predict the distribution of facies in the reservoir results in a better understanding of reservoir quality and behavior
- A comprehensive geomechanical model showing how the reservoir will respond to stress changes leads to improved recovery, safer drilling and lower costs
- Integrated subsurface platform with Aspen Epos™ and Aspen RMS™ reduces time to results

Key Features

- Sophisticated tool response modeling (Aspen Geolog Multimin) to derive the most reliable interpretation of mineralogy, porosity and fluids in the reservoir. The mineralogy of shale reservoirs impacts all aspects of drilling and production.
- A powerful toolkit for electrofacies characterization and log prediction (Aspen Geolog Facimage™) using multiple machine learning methods to perform cluster analysis, including Multi-Resolution Graph-Based Clustering (MRGC)
- Full waveform sonic data for insight into anisotropy
- Processing and interpretation of borehole image log data from any logging vendor, providing details of fracture and stress regimes in a well
- A geomechanical toolkit for assessing mechanical conditions around the wellbore
- Processing of cross-dipole full waveform sonic data from any logging vendor
- Comprehensive audit trail and flexible query and reporting tools
- Interoperability with third-party databases, including connectivity to the OSDU® Data Platform

Customer Success Story

CHALLENGE: In an unconventional hydrocarbon play in the Montney Formation in British Colombia, an operator needed to evaluate reservoir quality, brittleness and permeability, to identify which zones of the Formation had the highest chance of producible liquid hydrocarbons.

SOLUTION: The Multi-Resolution Graph-Based Clustering (MRGC) machine learning module in Aspen Geolog Facimage was used to build a brittle versus ductile electrofacies model. This was then combined with another MRGC model in Facimage to determine intervals of greater oil saturation. Using conventional crossplots along with Facimage, the team was able to determine clay types, brittleness, TOC and oil saturation.

RESULT: The asset teams were able to characterize the productivity potential of the Montney Formation and locate the best reservoir quality. This enabled the operator to focus its drilling program in the zones that would yield the highest return on investment.

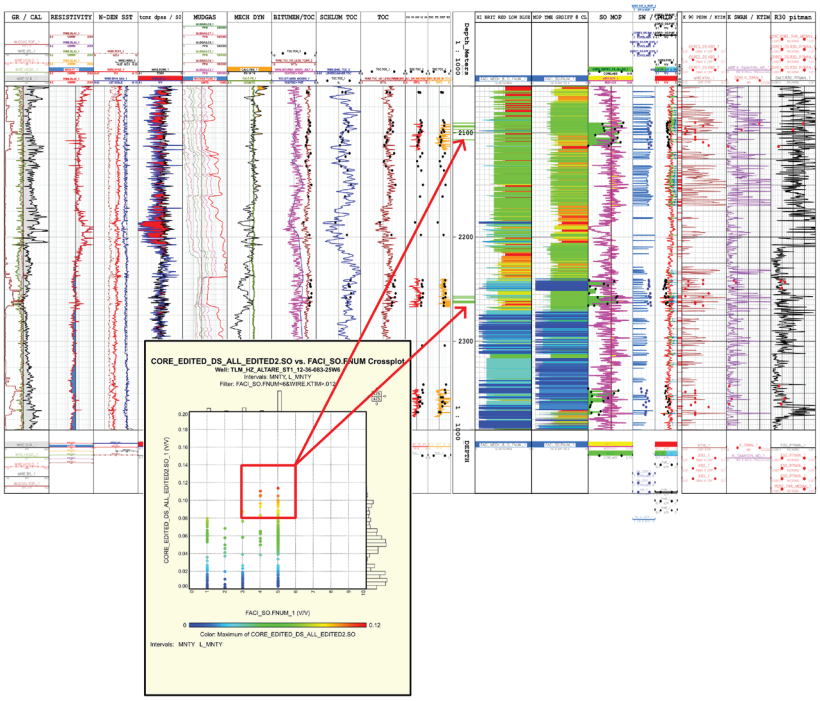

Figure 1. Results from an integrated petrophysical and geomechanical workflow using electrofacies to help identify higher oil saturation and permeability.