KELJOR GROUP, LLC

PRESENTATION ABSTRACT

AI-Assisted Geophysical Interpretation: What an Independent Geophysicist Can Accomplish Today

A Morgan's Bluff Hackberry Case Study

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Advanced seismic analysis, machine learning, and generative artificial intelligence are expanding what individual geoscientists can accomplish with existing data and commercially available tools. This presentation illustrates an integrated, AI-assisted interpretation workflow developed during a Hackberry reservoir study at Morgan's Bluff.

The investigation combines seismic conditioning, angle-restricted stacks, and AVO analysis using Lumina Geophysical software; multi-attribute evaluation, principal component analysis, and self-organizing maps using Geophysical Insights' Paradise; and analytical assistance from ChatGPT. The generative AI component supported well and production database reconciliation, quantitative comparisons, log and seismic modeling, evaluation of machine-learning classifications, and examination of competing geological interpretations.

The case study follows the progression from seismic conditioning to geological interpretation and calibration against well performance. It includes examples in which AI-assisted calculations and machine-learning results required correction, additional geological constraints, or rejection. These are important aspects of the workflow: specialized applications perform their intended analyses, while the interpreter determines which results are geologically meaningful.

For an independent consultant, the principal benefit is not necessarily a simpler or shorter workday. These technologies make it practical to ask more questions, test more hypotheses, and investigate problems that previously might have required outside specialists or resources beyond the scope of an individual assignment.

The objective is to demonstrate an accessible, collaborative approach to geophysical interpretation in which machine learning, generative AI, and professional judgment complement one another without confusing automated classification with validated geological understanding.