

Integrated Workflows for Pre-Drill Pore Pressure Prediction

Jack Taylor

Veritas Hampson-Russell, 10300 Town Park Dr., Houston, TX 77072

EXTENDED ABSTRACT

Accurate prediction of pre-drill pore and fracture pressures requires synthesis of data and knowledge from geophysical, geological, petrophysical and engineering disciplines.

3-D pressure volumes, estimated from high fidelity seismic velocities, provide a robust and pragmatic means to assess drilling risk and seal integrity.

This paper highlights the role of velocity analysis and model building methods as part of an integrated pressure prediction workflow. It will detail the following topics:

- Conventional versus “high-resolution” seismic velocity analysis,
- Pre-stack gather conditioning for high-resolution, automated velocity analysis,
- Integrating velocity and density (depth) trends from well data,
- Geologic constraints on velocity analysis and modeling for pressure prediction, and
- Assessment of velocity and pressure uncertainty.

Data examples (see Figures 1 and 2) from a variety of geological settings will be used to exemplify the importance of understanding the major causes of overpressure, and how this impacts the adopted workflow and final accuracy of results.

Pore Pressure Volume PPG: Deep Water Nigeria

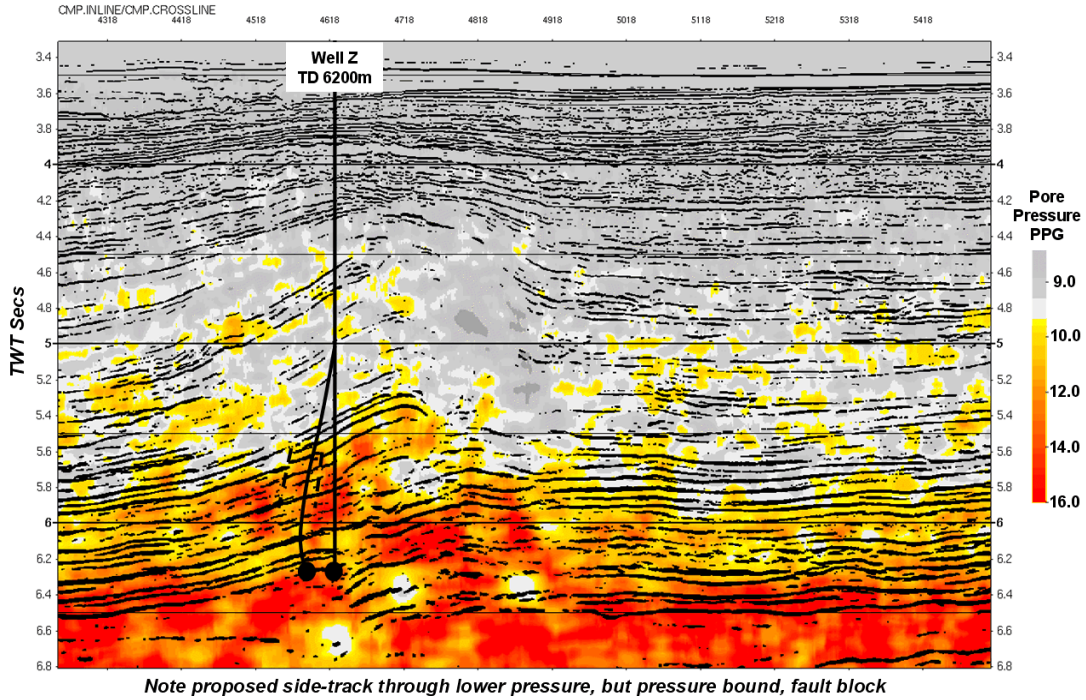


Figure 1. Seismic image and pore pressure volume overlay for optimum drilling location.

High Density Seismic Velocity Analysis with A-OK: Deep Water Nigeria

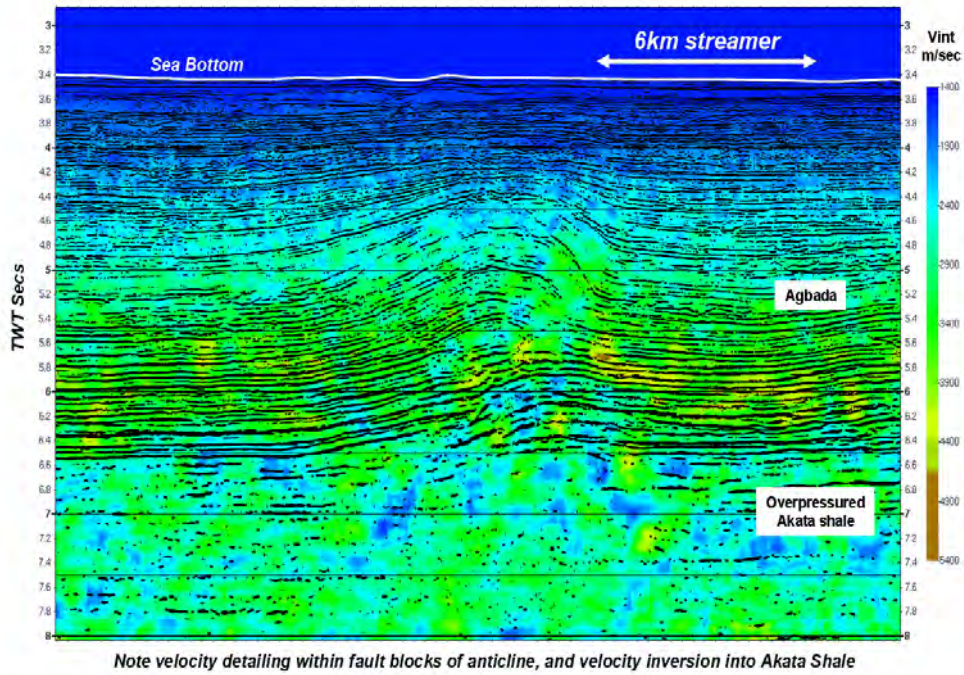


Figure 2. High-density, calibrated velocity models used for pore pressure prediction.