Workflow: Integration of core Chemostratigraphy for high resolution Geomechanics and Completion modeling

Chemostratigraphy helps refine reservoir targeting and completions solutions by characterizing the reservoir at the scale of facies variability, in the case of whole core, or, at the scale of cuttings collection. The integrative approach is undertaken using highly resolved (inch-scale) geochemical analyses using Energy Dispersive X-Ray Fluorescence spectroscopy (ED-XRF), X-Ray Diffraction (XRD), and LECO TOC.

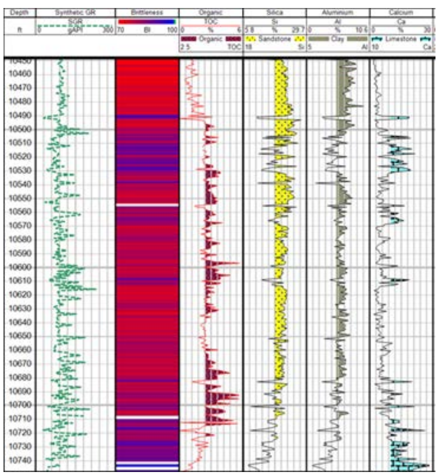

Figure1: Chemostratigraphic reservoir characterization

A detailed parameterization of the associations between elemental (mineralogical) and mechanical attributes of rocks is used to optimize the reservoir stress anisotropy model. This is accomplished through core and good log calibration studies.

Using the tie between elemental affinity and mineralogy, the integration of Geochemistry with Geomechanics provides a more realistic and more highly resolved model that captures the importance of thin beds, ash beds and bedding slippage effects below the resolving power of downhole tools.

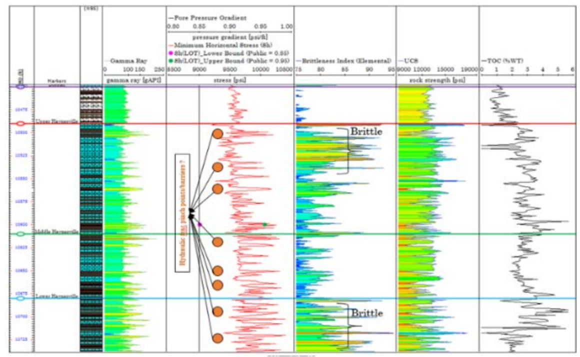

Figure 2: Mineralogy driven Mechanical Earth (MEM)

A fully developed Mechanical Earth Model (MEM) is calibrated via a three-step iteration process: Mini-frac, Pressure History Matching (PHM) and microseismic-bashing data.

The newly developed non-linear depletion modeling is used for field development projects such as (FDP) reservoir characterization and well spacing. The model effectively captures reservoir fracture asymmetry by taking into account the integrating changes in pore pressure and mechanical properties.

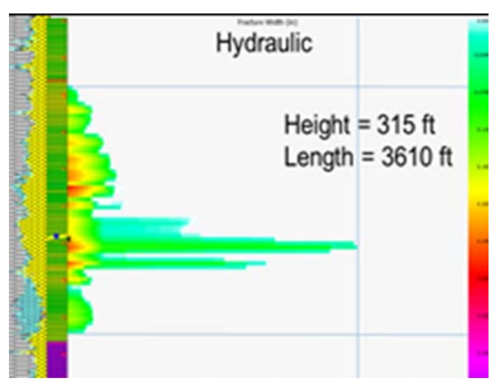

Figure 3: Simulation Hydraulic Fracture Geometry using core based MEM