

# Stress Analysis

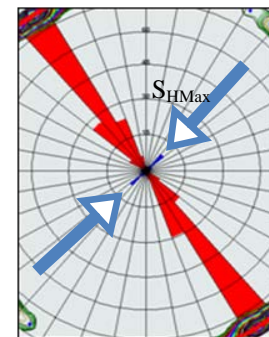
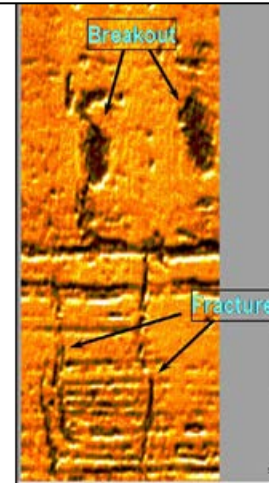
All geomechanics-related projects start with building a near-borehole geomechanical model. This encompasses the compilation of direct measurements, and analysis of those indirect indicators on the wellbore wall that are linked to mechanical characteristics and conditions of the formations being drilled.

At Task Fronterra we possess extensive experience and dedicated in-house software tools to synthesize and analyze all type of information provided. Our integrated approach allows us to deliver geomechanical models consistent with all field data, which can be successfully incorporated and developed into larger-scope studies.

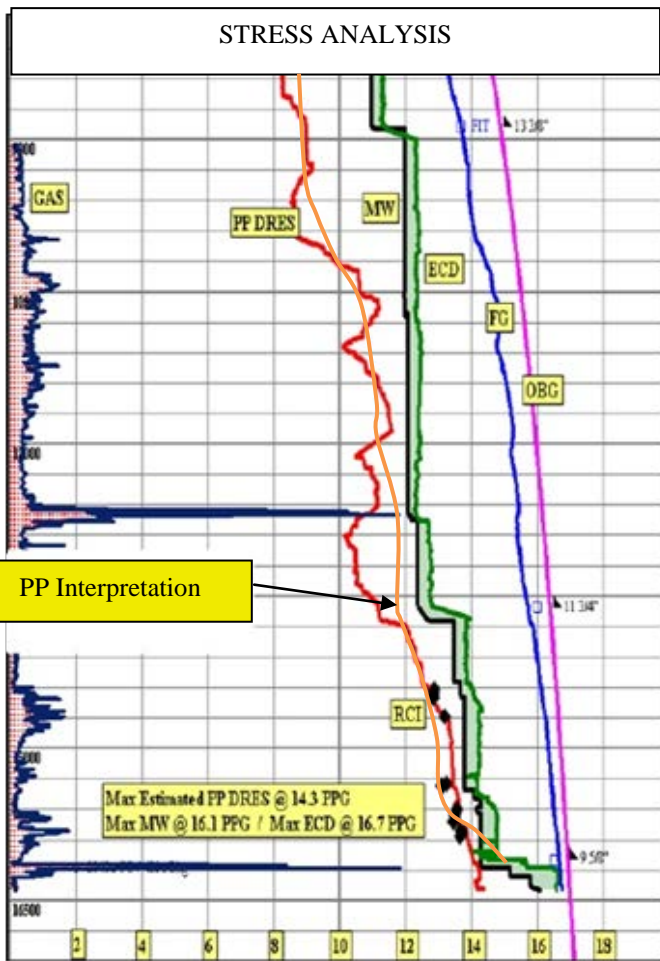
The geomechanical models include:

- In-situ stress field, pore pressure, and formation mechanical properties from logs, calibrated with lab tests and/or field data, and constrained by wellbore wall features identified in image logs, drilling events, mud program and/or any other petrophysical, structural or geological observation.
- Principal stress directions from borehole images and/or oriented caliper logs.

STRESS DIRECTION

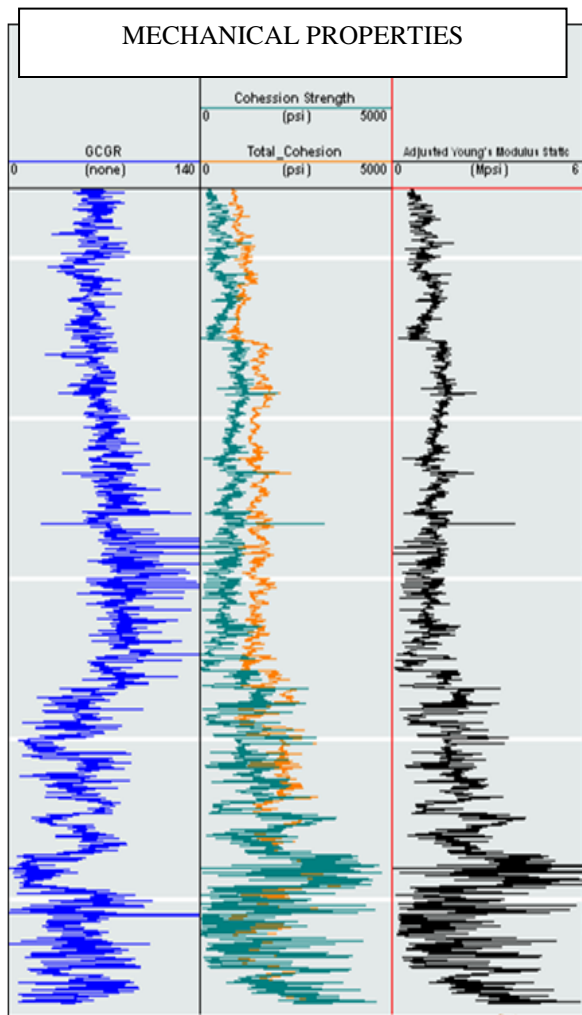


- Validation and calibration of the model by matching it to drilling events and shear failure existence and severity observed in borehole images and/or caliper logs.



The benefits of our geomechanical model analysis are:

- To provide a thorough characterization of the area near the analyzed boreholes, which allows the continuation of the geomechanical analysis into projects of larger scope. Example applications that are based upon near borehole geomechanical modeling are: borehole stability analysis, sand production prediction, critically stressed fractures, cuttings injection, compaction and subsidence monitoring, etc.
- Our approach guarantees that our models are consistent with all the information made available by our clients during the geomechanical model analysis.
- During the stages of the analysis we match our experts to the type of information being interpreted. This facilitates communication between the client and our staff, while allowing us to keep our clients engaged during the process and informed of our progress and findings.



The fundamental data required for building the model are:

- Logs: Gamma ray, density, resistivity, DTc/DTs, caliper
- Drilling reports: drilling events, LOT/XLOT/FIT curves, minifrac values, mud program, casing depths
- Image logs: Identification of breakouts and drilling induced tensile fractures
- Mechanical test results: lab measured dynamic/static deformability and strength parameters, strength envelope
- Stratigraphic column
- Structural maps

Optional data, if available:

- Stratigraphic and structural reports
- Fracturing, minifrac
- Neutron porosity log
- Cross dipole log, stress anisotropy interpretation
- Oriented (4-6 arm) caliper data

*Task Fronterra Geoscience is a global independent provider of industry leading, integrated geoscience solutions, from single well analysis to complete reservoir studies.*