

Predicting and Updating Geopressure 1000 Feet Ahead of the Bit at the Wellsite

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Predrill pore pressure predictions are typically made for planning purposes using analog wells, seismic and or basin modeling. Once onsite, pore pressure estimation from steaming LWD data often deviates from this prediction. The pre drill prediction becomes suspect and is usually not referred to again. A fit for purpose basin modeling capability that runs on a PC and can be employed at the rig site enables the model to be updated as new information becomes available, continually extending the prediction of pore pressure to in excess of 1000 feet ahead of the bit. The model includes both compaction and internally generated pressures (hydrocarbon maturation, etc).

Examination of the first wells this system on which this capability was deployed reveals that over 40% of the predrill predictions held within one half a pound per gallon over the entire depth of the well. By applying this technique on site and updating the model as new data becomes available the accuracy of the predictions rose to over 80% for the first 1000 feet and over 60% within one half pound per gallon for greater depths. Selected cases (including some from Australia's MW shelf) are reviewed and lessons learned presented.

The biggest cause of inaccuracy of prediction is in the ability to estimate the depth at which particular stratigraphic sequences will be penetrated. This often results in a pressure ramp coming in higher or lower than anticipated, altering casing depths. Anticipating these modifications to the drilling plan reduces non productive time and increases rig safety.