

## **Real-Time Wellbore Stability Forecasting: Recent Experience and New Challenges for Land-Based Operations**

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In difficult drilling environments there is usually a need for the downhole measurement of current borehole conditions and a prediction of the pore pressure, fracture gradient or borehole integrity likely to be encountered in the rock interval about to be penetrated. This type of forecast is particularly valuable in tectonically deformed settings, offshore and arctic wells, or where new technologies are being employed such as coiled tubing drilling, underbalanced drilling, extended-reach or multi-branching wells. Making the wrong call at the well site or back in the office can lead to serious instability problems such as hole collapse, lost circulation, stuck pipe, or at the worst, a well control situation. Too conservative a response can result in cost overruns, formation damage with over-weighted mud systems, long drilling times, extra casing strings and related risks. With today's generation of well site data acquisition systems, the latest LWD, MWD and PWD tools, high speed data transmission via satellite, and pore pressure and borehole stability modelling software, it is quite feasible to provide near to real-time monitoring and ahead-of-the-bit forecasting. Moreover, it is also feasible to have a continuously updating and self-calibrating earth model that calibrates the observed near-bit borehole behaviour to the predicted or theoretical response.

This presentation will review some of AGI's "just-in-time" experiences in solving or mitigating wellbore instability problems for land-based operations in Western Canada. As part of AGI's industry-sponsored DEA-147 project the feasibility of a real-time monitoring and forecasting strategy was investigated. The challenges faced by the industry in implementing this type of strategy for lower-cost, land-based settings will be highlighted.

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