

Surge and Swab Pressure Prediction – Field Validation

CHALLENGE

Moving a drilling string or casing is accompanied by pressure variations. The accurate prediction of surge and swab pressures is critical in wells where the pressure must be maintained within narrow limits to ensure trouble-free drilling and completion operation.

SOLUTION

Use SurgeMOD software to predict downhole pressure before running casing or calculate optimal running speeds.

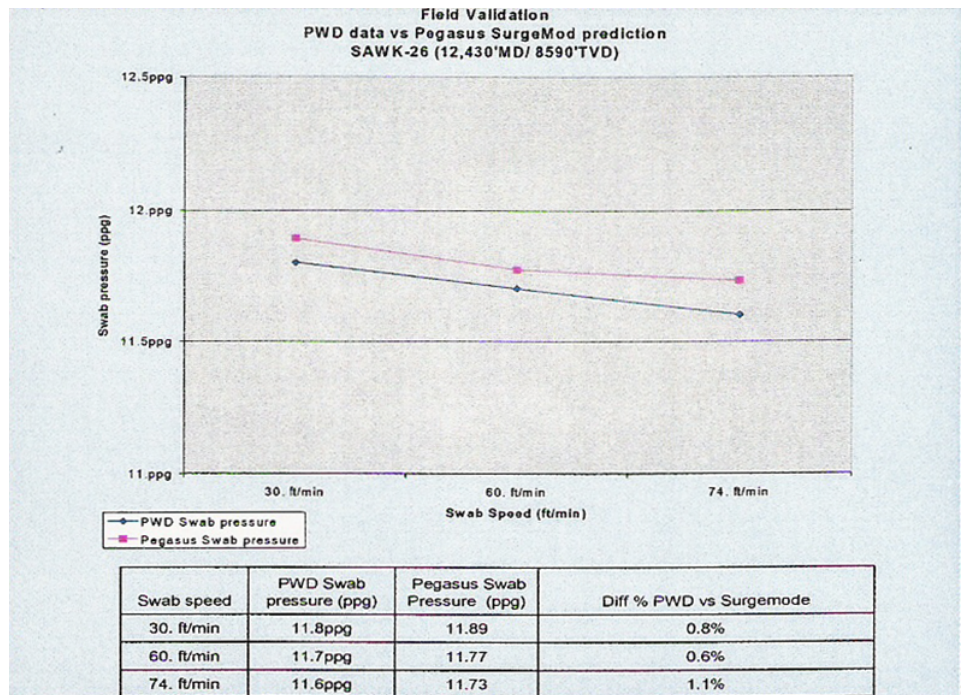
RESULTS

The result is a higher percentage of successful casing/liner runs, as indicated by the following case study, where closely matching results between SurgeMOD prediction and PWD measurement were found.

Excessive swab pressures may initiate a kick, while surge pressures in great magnitude can fracture formations. This is particularly true for ERD wells, slim hole and deep water offshore drilling because of restricted flow paths and limited number of casing and liners.

PVI's surge and swab hydraulics software SurgeMOD analyzes complex down-hole hydraulics when running casing or making a trip for various pipe ending conditions and circulation sub tools. In addition, it allows engineers to avoid loss of circulation or kick resulting in higher success rates in casing/liner runs and other tripping operations. A major service company also adopted SurgeMOD as part of their Standard Operating Procedures (SOP) for casing running.

Union Oil Company of California (Unocal) needed to evaluate and utilize surge pressure software to achieve better casing/liner running jobs. Their engineers in Thailand and Malaysia compared SurgeMOD prediction with PWD data for a directional well (12,430' MD/8590' TVD). The difference between measured and SurgeMOD predicted swab pressures is less than 1%.



Software Evaluation: Calibration of SurgeMOD vs. Actual PWD Data