REAL TIME DETECTION AND CONTROL OF WELLBORE INSTABILITY

Fact Sheet

Project Information

Grant agreement ID: OG.-00199-95

Funded under
FP4-NNE-THERMIE C

Start date
1 January 1996

End date
31 December 1998

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€ 1 948 628

EU contribution
€ 779 451

Coordinated by
Schlumberger Cambridge Research Ltd
United Kingdom

Objective

The aim of the project is to demonstrate that a real product for monitoring and controlling wellbore instability will reduce drilling cost by providing i) information on the evolution of the wellbore during the drilling process ii) recommendation on mud weight, mud property, mud circulation, casing point and well direction. This product, which involves measurements acquired while drilling, must be robust and easy to use. It is an extension to an existing commercial simulator, IMPACT, incorporating results of research recently completed at Schlumberger Cambridge Research and TNO. The demonstration will be carried out in the North Sea Everest Complex where drilling problems are significant.

Work has been completed according to schedule. The field demonstration of the real-time wellbore stability control process has been carried out in Amoco's Valhall Field of the North Sea. The process made a significant impact on the drilling of the targeted interval.

The tool will be a system running at or in close contact with an active drilling rig,
accepting data concerning drilling conditions, diagnosing problems of hole stability, and recommending the best method to overcome them. The diagnosis will also be used to update a mathematical model of the wellbore, to improve drilling performance on subsequent wells. The project is in six phases, and uses one of Amoco’s North Sea fields as a source of data and, in the later stages as a demonstration area for the tool during the drilling of new wells. Phase I is collection and assembly of data for the field, including seismic, drilling and logging records. This allows a picture to be built up of the drilling and hole stability problems encountered in the field, and also generates datasets on which the software can be tested. Phases II and III generate 2D and 3D petrophysical and geomechanical models of the field, onto which real well trajectories can be superimposed for stability assessment. Phase IV examines the stability of deviated wellbores using a finite element model, in order to generate correction factors for the effects of deviation in the relatively simpler models to be used in the real-time algorithm. Phase V is the generation of the algorithms and prototype software for the product, and Phase VI is the demonstration, evaluation and monitoring of the product during the drilling of a new well. The product will use the experience of wellbore instability management gained over many years by the partners, incorporating this into the software perhaps as an expert system. It will also use advanced visualization techniques to display the results of the analysis to the drilling team, since strongly-visual presentation of hole conditions has been found to be vital in promoting the acceptance of such analyses.

Programme(s)

Topic(s)

Funding Scheme

DEM - Demonstration contracts

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