

Microhole Coiled Tubing Bottomhole Assemblies

DE-FC26-05NT15487

Goal

The project goal is to combine existing technologies for measurement-while-drilling (MWD) and logging-while-drilling (LWD) into an integrated measurement system to facilitate low-cost drilling of small (3/2-inch diameter), shallow (<5,000 foot depth) boreholes using coiled tubing drilling (CTD) technology. The project will deliver two prototypes ready for field testing.

Performer

Ultima Labs
Houston, TX

Results

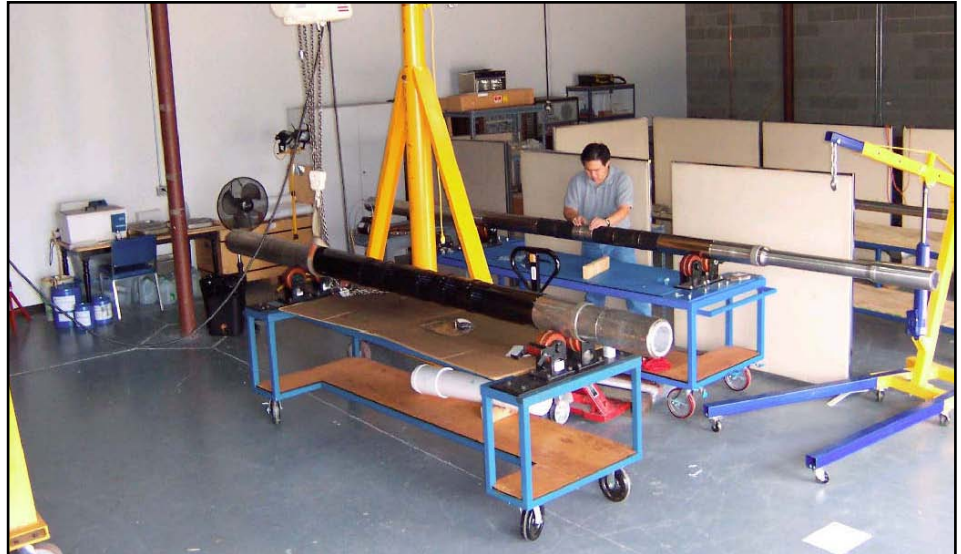
The project was launched in April 2005. The first prototypes are scheduled for field testing in 2007. The measurement system will provide critical enabling measurements for efficient CTD and formation evaluation. MWD measurements include inclination and azimuth for directional control and weight on bit (WOB), torque, and bore and annular pressure for drilling optimization. LWD measures natural gamma ray and propagation resistivity.

Benefits

The project will combine existing, proven technologies for MWD and LWD into an integrated, cost-effective downhole measurement system. Drillers will use the MWD measurements to optimize drilling performance. Geologists will use the LWD measurements to optimize wellbore placement and completion for maximum production and to estimate resources in place.

Widespread adoption of microhole technology will enable low-risk infill development that could potentially tap billions of barrels of bypassed hydrocarbons at shallow depths in mature fields. Exploration efforts in search of new reserves will benefit from the anticipated cost and environmental benefits. DOE estimates remaining U.S. shallow resources at 218 billion barrels. Recovery of just 10% of the targeted resource would yield a volume equivalent to 10 years of OPEC imports at current rates.

Mature producing areas worldwide also will benefit from the technology.



Ultima Labs' bottomhole assembly.

Development of technology that expands global sources of hydrocarbons ensures a diversity of supplies and maintains the United States as the leading global supplier of oilfield technology.

Background

As the technology to drill microhole wells develops, the tools to conduct downhole measurements in the smaller holes will be needed as well. This project is developing an integrated tool to improve drilling efficiency and reduce cost. In addition, the increased information about the downhole rocks and environment will allow more accurate reserves estimates and development planning.

Summary

The early phase of the project establishes design requirements and generates a conceptual design that meets these requirements. The conceptual design phase has been extended to incorporate industry input on sensor placement. Following review and approval of the conceptual design by the project team, most detailed design will begin on the mechanical and electronic subassemblies and sensors. Some detailed design and evaluation of low-cost directional sensors is already underway.

Detailed design will accelerate during Q1 2006 as additional personnel are added to the project. Individual subassemblies will be tested and incorporated into the prototypes during prototype assembly. The completed prototypes will be tested in the lab and in a flow loop to verify pulser operation prior to the first field test.

Here is the project timetable:

- Project launch, April 2005.
- Conceptual design, Q3-Q4 2005.
- Detailed design, Q4 2005-2006.
- Prototype assembly, Q3-Q4 2006.
- Two prototypes ready for field test, Q1 2007.

Current Status (January 2006)

Efforts to date have focused on the detailed design specification and conceptual design. Valuable industry feedback was received at Microhole Technology Integration meetings in August and November sponsored by the Petroleum Technology Transfer Council. Staffing on the project is being increased for detailed design efforts.

Project Start / End: 2-1-05 / 1-31-07

DOE / Performer Cost: \$795,515 / \$189,879

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