DOWNHOLE VIBRATION MONITORING & CONTROL SYSTEM QUARTERLY PROGRESS REPORT #17

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ABSTRACT

The objective of this program is to develop a system to both monitor the vibration of a bottomhole assembly, and to adjust the properties of an active damper in response to these measured vibrations. Phase I of this program, which entailed modeling and design of the necessary subsystems and design, manufacture and test of a full laboratory prototype, was completed on May 31, 2004.

The principal objectives of Phase II were: more extensive laboratory testing, including the evaluation of different feedback algorithms for control of the damper; design and manufacture of a field prototype system; and, testing of the field prototype in a drilling laboratory. Phase II concluded on January 31, 2006, and the Phase II final report was issued.

Work on Phase III of the project began during the first quarter, 2006. Efforts the current quarter have continued to focus on the manufacture of the prototype and precommercial parts, field test planning and commercialization.

The continued extreme lead times quoted by oilfield machine shops for collar components, is delaying the deployment of the prototype and precommercial units. Through diligent efforts by our purchasing department, we have received the vast majority of the parts. The delivery date for three critical parts from one supplier has now slipped to mid-January, which will preclude deployment for a field test before February.

We have entered into a Memorandum of Understanding with a major US oilfield equipment supplier, which calls for their assisting with our field tests, in cash and in kind. We are close to signing a definitive agreement which includes the purchase of the three precommercial units. We had also signed a CRADA with the Rocky Mountain Oilfield Test Center (RMOTC), and scheduled a test at their site, commencing ~January 15, 2007. In addition to the delays cited above, the RMOTC drilling schedule has since slipped, and the test cannot begin until some time in February.

Based on these factors, we are requesting a no-cost extension to April 30, 2007.

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Executive Summary

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Design

Redesign of laboratory prototype

COMPLETE.

Design of feedback system

COMPLETE.

Intermediate prototype design

COMPLETE

Design of field prototype tool

COMPLETE

Design of precommercial prototype tool

COMPLETE

Experimental

Retesting of DVMCS prototype

COMPLETE

Preparations for Testing at TerraTek

COMPLETE

Testing at TerraTek Drilling Laboratory

COMPLETE.

Manufacture of Prototype and Precommercial Tools

As discussed in earlier reports, we have telescoped the prototype and precommercial phases to expedite entry into the market. We are in the process of manufacturing three precommercial prototypes for testing in the field. Our commercial partner has agreed to support this testing with personnel, equipment (especially, bits) and will, once a definitive agreement is signed, purchase the precommercial tools after the testing.

As noted last quarter, the current demand for oilfield machining has created extremely long lead times for key items. Our purchasing department was able to disperse the orders among a variety of machine shops and expedite the production of most parts. Nevertheless, ongoing delays by one manufacturer have

pushed the likely delivery date for several key components (including the main upper sub and the valve housing) beyond the first of the year*. This will preclude any field testing before the end of January, the current termination date of this program.

In the interim, subsystems for which all the parts are available are being assembled. At the end of the period, the torsional bearing pack and turbine-alternator assemblies for the first precommercial tool were complete and work has begun on several others.

Preparation for Field Testing

We are completing the fixturing that will permit testing of the precommercial prototypes on our high-pressure flow loop prior to shipment to the field test. This apparatus will be in place when the first tool is complete.

Field Testing

We have signed a CRADA with RMOTC were planning to do the first field test there, beginning on January 15, 2007. RMOTC have since informed us that their drilling schedule has slipped and the earliest the test can begin is in mid-February.

Analysis

TerraTek data

COMPLETE.

Commercialization

We have signed a Memorandum of Understanding with a major international oilfield equipment supplier based in the US. This MOU provides support for our field testing through the provision of bits and manpower, as well as financial support. In addition, once a definitive agreement is signed, the company will buy the three precommercial prototypes. A final agreement will be signed in the next few weeks..

We are currently in negotiations with Sandia National Laboratory regarding a possible non-exclusive license to their related technology. An agreement is expected in the next quarter.

* After the close of the period, we received parts to complete one tool. The parts for the other two tools are still several weeks away.

Units

To be consistent with standard oilfield practice, English units have been used in this report. The conversion factors into SI units are given below.

1 ft.	=	0.30480 m
1 g	=	9.82 m/s
1 in.	=	0.02540 m
1 klb.	=	4448.2 N
1 lb.	=	4.4482 N
1 rpm	=	0.01667 Hz
1 psi	=	6984.76 Pa