

## **Third Quarterly Microhole Integration Meeting Minutes**

March 22, 2006  
Houston Research Center  
11611 West Little York Road  
Houston, Texas 77041

The third quarterly Microhole Integration Meeting was held in Houston on Wednesday, March 22, 2006. Sixty people from all segments of the industry pre-registered. Actual attendance was 58. This meeting, and the series of integration meetings, is designed to provide a forum for the principal investigators of the projects in, and related to, the DOE Microhole Technology Program to present project accomplishments, milestones and remaining tasks to interested industry parties and researchers in related areas. The secondary goal is to highlight industry activity that is applying this and related technology in the field, with the goal to align the research goals with the needs in the field and bring to commercial application and industry adoption the technologies developed in the program. The morning coffee, breaks, lunch and post-meeting period provided opportunity for individual discussions. All presentations made at the meeting, as well as the previous two meetings, are posted on the PTTC Microhole website [http://www.microtech.thepttc.org/past\\_meetings.htm](http://www.microtech.thepttc.org/past_meetings.htm).

The meeting began with registration, coffee and networking from 8:00 to 8:30. Don Dutlinger, Executive Director of the Petroleum Technology Transfer Council called the meeting to order, discussed safety and logistics, and then introduced Roy Long, DOE Technology Manager for the National Energy Technology Laboratory and Ginny Weyland, DOE Project Manager for MHT. Roy Long summarized recent progress and highlights of the program as well as recent and planned industry presentations. After reviewing the day's agenda, Long introduced Dwight Rychel, PTTC Microhole Technology Program manager. Rychel discussed the meeting objectives and future regional MHT workshops to be held in McPherson, Kansas April 12<sup>th</sup>, Denver, Colorado May 19<sup>th</sup>, Cambridge, Ohio May 31<sup>st</sup> and participation in the Southwestern Petroleum Short Course in Lubbock, Texas April 26<sup>th</sup> and 27<sup>th</sup>.

The remainder of the morning session consisted of Principal Investigators providing updates and milestones for six MHT ongoing projects. In a somewhat different format from the previous two meetings, only those projects with new results and major milestones to report were featured, allowing time for a more thorough review and questions and answers. The highlights were:

- Gas Technology Institute (Field Demonstration of an Existing Microhole CT Drilling Rig, Kent Perry) This very successful project is about a month from wrapping up. 23 project wells were drilled in the shallow Niobrara Chalk play in Western Kansas and Eastern Colorado at an average cost 29% below comparable rotary costs. As the program progressed, wells were being drilled at a rate of one per day, faster than they could be permitted. In all, the rig drilled 220 wells, 300,000 feet of hole, in 2005. A second rig has been placed in service and a third

is under construction. A number of obstacles were overcome to achieve acceptance of the well design of 4-½ inches with 2 7/8-inch production casing.

- Schlumberger (A Built-for-Purpose Coiled Tubing Rig, Bart Patton): This project has had a significant shift in direction. Due to a shortage of engineering and manufacturing resources and time constraints, the plan to engineer and construct the rig from the preliminary design was shelved and an existing rig built by Foremost was purchased from Pioneer Resources. The controls and injector will be updated to allow underbalanced drilling. The trailer will be examined and possibly modified to transport 6,000 ft. of 2 3/8 inch coil. There has been some industry interest in the rig availability, but no definitive plan has been set for the field testing.
- CTES (Friction Reduction for Microhole CT Drilling, Ed Smalley): The first phase of building the test stand and vibrator and bench testing is complete. Unfortunately, the measured friction reduction was only a fraction of what is needed. An alternate Phase II was proposed utilizing third party technology that vibrates the coil, which is contained in a canister. This is subject to licensing agreements to be negotiated.
- Baker Hughes Inteq (Microhole Smart Steering and LWD System, Thomas Gregg presenting for John McPherson): A 2-3/8 inch rib steering motor device and a 2-5/8 inch resistivity measurement device has been developed. Due to a delay scheduling the manufacturing, the project was extended from 18 months to 21 months. Two prototypes of each have been assembled and are at the well site in Alaska for testing.
- Technology International, Inc. (High Power Turbodrill and Bit for Coiled Tubing, Bob Radke and David Conroy of Sil Neyfor): The 2 7/8-inch prototype has been tested at 1100 and 2200 rpm with both TSP cutter and PDC bits. Phase II will produce a prototype with more power and shorter length. Conroy discussed the model used to optimize the motor and bits.
- Confluent Filter Systems (Advanced Monobore Concept CFEX Self-Expanding Tubular Technology, self Expanding Sand Screen Technology, Jeff Spray): The Phase I proof of concept of self-expansion is nearing completion. Early designs of corrugated construction have given way to a new split tube that will be able to self expand 135% to 200%. It is scalable to indefinite thickness, indefinite pressures and unlimited materials properties. The sandscreen design is cellular, like the early self-expanding tubulars. It is expandable 125% to 150%, with less than a 50 micron retention and a 4,000 psi collapse rating – 4 times greater than today's standard.

The afternoon session was kicked off by Dwight Rychel, who introduced the first industry speaker.

Ernie Majer, a geoscientist at Lawrence Berkeley National Laboratory presented results from their project "Vertical Seismic Profiling with Microholes at RMOTC (Rocky Mountain Oil Testing Center, Casper Wyoming). This DOE project was done in conjunction with Don Dressen's and Jim Thompson's microhole drilling project, performed by Los Alamos National Laboratory. Different recording devices,

hydrophones, MEMS, and conventional (but small) geophones were used in holes from 800 to 1500 feet. The geophones produced the best results. The source used was equally downsized. While much of the data are still being processed, the early results showed geological features could be detected up to five times the depth of the well. Other experiments were run using passive seismic to detect natural events such as earthquakes and manmade events such as hydraulic fracturing. Preliminary discussions have been held with potential industry partners to use the VSP for monitoring an existing CO<sub>2</sub> flood and the passive devices for monitoring hydraulic fracturing. The need for greater resolution devices and process and lower costs was emphasized.

The second speaker of the afternoon was Arnis Judzis, of TerraTek. He briefed the attendees on their DOE project "Investigation of Smaller Footprint Drilling System: Ultra High Speed Drilling Rotary Drilling." This project predates those awarded under the Microhole solicitation and is longer duration, but clearly related to the program with synergies with the high speed motors being developed within the MHT program. TerraTek is near completion of the first phase of the project, investigating diamond bits at speeds up to 40,000 RPM. High rates of penetration were observed in bench tests of 1 – 2 seconds duration, with smaller cuttings generated at higher speeds. In Phase II a high speed motor will be selected, electric, hydraulic, or turbine and larger bits (3 inches) will be field tested at somewhat lower speeds.

The third speaker was Tom Wood, of Xtreme Coil Drilling whose presentation was "U.S. Markets for Coiled Tubing Drilling." Xtreme is a relatively new Calgary-based drilling company and has committed \$100 million for 10 coiled tubing drilling rigs, two of which have been received and committed to long term contracts. Wood described the growth of coiled tubing drilling in Canada and the previous attempts at drilling in the U.S. Xtreme plans to commit 80% of their assets to the U.S. They will utilize five different rig designs and expect to use reels carrying 13,000 feet of 3 ½-inch coil to drill up to 10,000 feet wells in the fall in Colorado and Wyoming. Longer term, they see a larger market in coalbed methane drilling in the Rockies and Appalachia. They believe 25,000 of the 35,000 wells drilled in the U.S. last year were candidates for drilling with coiled tubing.

The final presenters were Bart Patton and Scott Tinkham, of Schlumberger. Patton presented the highlights from the marketing study done as an early task in their project "A Built for Purpose Coiled Tubing Rig." The study is posted on the PTTC website at [http://www.microtech.thepttc.org/schlumberger\\_ipc/schlumberger\\_market\\_analysis.pdf](http://www.microtech.thepttc.org/schlumberger_ipc/schlumberger_market_analysis.pdf). The report concludes that there is a considerable market for small bore coiled tubing drilling and the way to exploit it is to establish the infrastructure initially drilling shallow natural gas and coalbed methane wells and once established, expand to deeper wells, seismic monitoring and exploratory drilling. Tinkham gave highlights of the development of coiled tubing drilling in Canada, describing the players in the market, where they are drilling and new rig orders.

The meeting concluded with a wrap-up led by Roy Long. The next meeting will again be set to coincide with the DEA quarterly meeting on Wednesday, August 16, 2006. The meeting was adjourned at 3:30.