Intellipipe moving closer to commercial reality

Mike Reeves, GrantPrideco

IT'S BEEN SEVERAL years since **Grant Prideco**, **Novatek** and the **US Department of Energy** first announced successful field trials of IntelliPipe®, a high-speed drill pipe telemetry system. At the time many within the industry expressed doubts if such a system could make the leap from research project to commercial product. However, recent updates indicate this transition is already well underway.

IntelliPipe is one of a suite of intelligent drill string components offered by IntelliServ Inc., a company owned jointly by

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oilfield tubular manufacturer Grant-Prideco and Utah based Novatek. Using electrical cable, the IntelliPipe system transmits data from typical downhole sensors: MWD, LWD and rotary steerable tools, with speeds on the order of 1 million bits per second. (In contrast to conventional mud-pulse MWD technology, which transmits data at rates up to 12 bits per second). The cable is attached to the inner pipe wall, and data is transmitted across tool joints via inductive couplers. These couplers are circular in design and require no special orientation of the tool joints. Essentially, the pipe is a modified version of conventional drill pipe, designed to look and behave just like standard tubulars without the need for special handling tools or processes. The system uses amplification joints or IntelliLinks® at 1,000-foot intervals to boost the data signal. These amplification joints also have the ability to house measurement sensors, allowing data to be collected along the length of the drill string. Finally, a rotating sub on the top drive delivers the data to surface workstations and servers.

Since their initial industry launch, the IntelliServ team has been focused on the development and field-testing of a variety of system components:

In early 2003 IntelliServ conducted it's first full drilling test of an IntelliPipe string at the Rocky Mountain Oilfield Test Center in Wyoming. Over 4,300 ft of 5 ⅞-in. IntelliPipe and IntelliHWDP® were utilized to side-track an existing well from a cement plug and then drill almost 400 ft and ream over 600 ft of hole. Throughout program, the IntelliServ team was able to establish and maintain two-way communication along the length of the string, transmitting basic temperature and shock data at speeds in excess of 1 million bps.

Almost 4,000 ft of IntelliPipe has been in constant use at a private US test site since the summer of 2003. The string has been subjected to a full array of wellsite operations, including extensive drilling, reaming, tripping and cementing. IntelliServ has expressed satisfaction with the mechanical performance of the pipe during these tests and seem set to continue with ever more challenging operations in 2004.

In addition, IntelliServ has worked closely with one of the industry's largest drilling jar manufacturers and has successfully tested a first-generation IntelliJar®, a tool with all the mechanical properties of a standard drilling jar while supporting the transmission of IntelliServ data at high speeds even during jarring operations.

The IntelliServ team is receiving positive feedback from a number of US operators and are confident the IntelliPipe system will be deployed to an active commercial well-site during the spring of 2004. Several major oilfield service companies have also expressed interest in the system and appear ready to complete the work necessary to link existing downhole tools to the network.

The ultimate prize for IntelliServ, and the industry at large, is the opportunity to take advantage of high-speed, high-volume, bi-directional drilling data in real-time. Such a system offers a number of advantages over current technology: Instantaneous data transmission will eliminate non-productive time associated with the low data rates offered by mud pulse telemetry; high-volume data transmission will allow real-time delivery of logging information typically only available after drilling is finished (for example, fullbore images and seismic wave forms that have the potential to further improve wellbore placement); and bi-directional communication that could bring true closed-loop drilling systems to fruition as well as allowing precise control of mechanical tools like under-reamers and variable-gauge stabilizers.

However, it's the network's ability to support distributed measurement points that may offer the biggest short-term prize. With measurement packages placed at regular intervals along the string, drillers will have full visibility of their wellbores at all times. Annular pressure, vibration and temperature profiles from surface to TD should allow true pressure controlled drilling, improved drilling efficiency and, most importantly, enhanced well-control capabilities.

A team of over 70 engineers work exclusively on IntelliPipe related projects and have so far completed over 11,000-feet of IntelliPipe for use in future field trials.

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