



**OTC 20067**

## **Intelligent Wired Drill Pipe System Provides Significant Improvements in Drilling Performance on Offshore Australia Development**

Luke Lawrence, Apache Energy Australia; Bruce Redmond and Rick Russell, Halliburton; and Dave McNeill, Mike Reeves, and Maximo Hernandez, NOV Downhole Telemetry

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This paper was prepared for presentation at the 2009 Offshore Technology Conference held in Houston, Texas, USA, 4–7 May 2009.

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### **Abstract**

An ‘Intelligent’ wired drill-pipe system has recently been used on a large offshore development in North West Australia for Apache Energy Limited. The IntelliServ<sup>®</sup> network is designed to overcome the shortcomings of mud pulse telemetry in terms of real-time data transmission speeds and pulser reliability. By utilising this unique system of Intellipipe<sup>®</sup> wired drill pipe and associated drilling tools connecting the Rotary Steerable System and LWD string to the surface, transmission speeds of up to 57,000 BPS theoretically can be achieved.

For the development of the Van Gogh Field, Apache Energy Ltd decided to utilise the IntelliServ system along with Halliburton’s rotary steerable system and LWD tools.

This paper will describe the wired drill pipe network and its integration with a drilling assembly containing a rotary steerable system, multiple formation evaluation and drilling dynamics sensors. The objectives for running the wired drill pipe system on this project will be discussed and the actual operational experience reviewed. Topics to be covered will include the improvements in drilling optimisation and drilling performance, the increased accuracy in wellbore placement, and the improved quantity and quality of the formation evaluation data received in real-time. The future uses and benefits of this technology also will be reviewed.

### **Introduction**

Modern MWD and LWD sensors now generate so much data that it is not possible to take full advantage of this data due to the limitations imposed by conventional mud pulse telemetry systems. Although advances have been made in the form of data compression and batch transmission modes, mud pulse transmission is still the limiting factor in many potential applications.

Typical LWD assemblies may now consist of tool combinations including gamma-ray, multiple resistivity, density and neutron petrophysical measurements. The latest LWD sensors can provide formation images, sonic waveforms, and multiple geosteering signals, all of which require large bandwidths in order to take full advantage of them. In addition, directional survey data, downhole drilling optimisation measurements also may be transmitted. This amount of data can place a great strain on conventional mud pulse telemetry systems. As drilling rates increase the data density of the real-time measurements becomes increasingly sparse until at some point, drilling rates must be held back to ensure that a useable log is received in real-time.

### **Telemetry Drill String Technology Overview**

The wired drill pipe system offers an ultra high-speed alternative to current mud pulse telemetry methods. The network utilizes individually wired drill string components that can deliver bi-directional telemetry at speeds of 57,000 bits per second. Existing MWD telemetry has shown data rates of up to 24 bits per second, but this data rate is usually only achievable under ideal conditions, and is lagging behind advancement in downhole MWD/LWD tools that are becoming