

# Measurement While Drilling

## Positive Mud Pulse System

*“Newsco developed and refined a robust and highly efficient Positive Mud Pulse MWD system designed to operate reliably in the harshest drilling environments.*

*This MWD system provides flexibility for additional sensors, remote operation and in-field maintenance.”*

## MWD Positive Mud Pulse

*Our MWD system has the best reputation and success on the market today*

### *Our challenge*

Conventional MWD systems suffer from poor performance, reliability and maintainability and are prone to failure in high-percentage LCM, high wash and harsh environments.

### *Our solution*

In 1994, Newsco took off-the-shelf tools and re-engineered them to create the most power-efficient and reliable MWD tool on the market today. We made significant improvements in durability, efficiency, flexibility, performance, and maintainability. It has consistently performed admirably

in some of the harshest drilling environments in the world.

### *Durability and efficiency*

The revolutionary bottom-end pulser-driver assembly we developed in house is typical of the innovative thinking of our R&D team. By re-engineering off-the-shelf components and developing new mechanisms, we substantially extended the MTBF of



MWD Features
Down-link capable
Remote operation/WITS compatible
Real-time display and logging
Wireless communication to rig floor
High tolerance to LCM
All mud types
Wireline retrievable / re-insertable
All collar sizes

Positive Mud Pulse MWD Specifications	
Battery life	>700 hours @1.5 second data rate
MTBF	>2000 hours
Inclination	0° - 180°, 0.1° accuracy
Azimuth	0° - 360°, 1° accuracy
Dip angle	0° - 90°, 0.1° accuracy
Tool face	0° - 360°, 0.1° accuracy
Vibration survival	20G @15-500 Hz
Shock survival	1000G @ .5 millisecond, half sine
Flow rates	0.3 m <sup>3</sup> - 5.0 m <sup>3</sup> (75 gpm - 1400 gpm)
Pressure drop across tool	100 PSI @ 400 gpm (1.5 m <sup>3</sup> )
Data rates	.25 to 2 seconds, configurable
Data encoding	Five-level, M-ary scheme
Bending radius	90° / 100 feet (30 metres), non rotating
Operating temperature	302 °F (150 °C)

the mechanical components and also increased the battery life of the pulser assembly from 125 hours to more than 700 hours—a 500% increase and a huge cost savings. This is the best retrievable MWD system on the market for efficiency, durability and reliability. Improved centralization and carbide components ensure that this tool will resist wash out in harsh mud environments and can remain in continuous operation down hole for 300 hours or longer.

### Flexibility and performance

**Remote operation:** When linked with the Remote Terminal, Newsco personnel can monitor a well any where else in the world, from our location in Calgary, Alberta, Canada, as if situated at the well site.

**Portability:** The tool is designed to be easily disassembled and packaged to fit in a container for truck transport or air freight around the globe. Each kit contains equipment to provide field serviceability.

**Wireless operation:** Conventional systems require cables strung across the rig floor, which is time consuming to set up and a safety hazard during operation. This is a completely wireless system, using spread-spectrum radios. It is immune to interference from other radios on site and eliminates grounding issues and noise associated with signal cables run parallel to nearby power cables.

The radios have a 20-mile point-to-point range. Set up or tear down time is greatly reduced—plug the display in the wall, connect a transducer and you are up and running.

**Data encryption:** Because the system is wireless, to ensure client confidentiality, data transmission has five levels of encryption for security in tight-hole wells.

**Configurable displays:** The drill operator can choose from among several screens on these weatherproof, daylight-readable displays to present information in a format that he prefers. (Text data or rosebud; 0° - 360° or ±180°, for example).

**Additional displays:** We can customize a display to meet your needs and include any telemetered or instrumentation information; such as, tank volumes, gas volumes, alarms, etc. Readouts in French, Spanish, Russian, and other languages are available.

**Multiple data rate and decoding:** Different data rates or measurements can be acquired by down-linking to tools while down hole. Improved decoding, through advanced filtering and discrimination, provides reliable information at surface.

**Non-volatile memory:** In the event of a bottom-hole-to-surface communication failure, drilling can continue, and then data can be

retrieved from the tool once on surface.

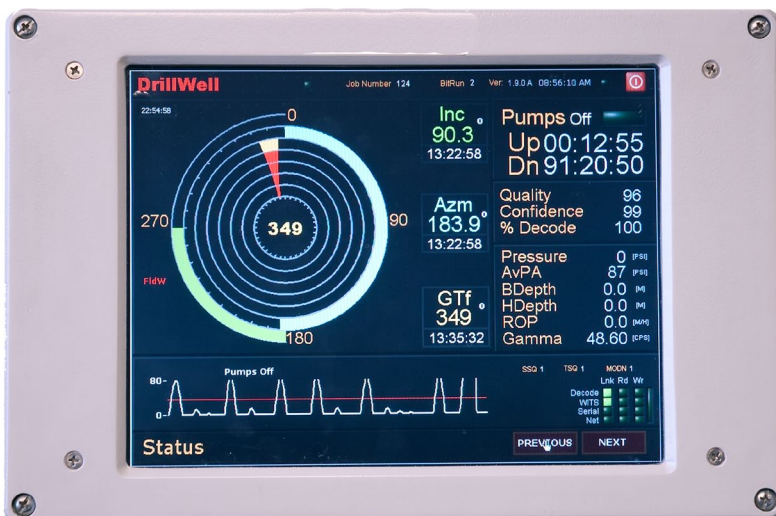
**Decoding modules:** A wide range of industry-standard, high-accuracy modules are available and can be integrated into the assembly: gamma, focussed gamma, weight on bit, pressure while drilling, and resistivity.

**Logging software:** We use state-of-the-art ENVISION logging software designed in collaboration with MWD field operations.

### Maintainability

**Diagnostics and test equipment:** We have developed test equipment and field diagnostics to assist operators and technical staff to troubleshoot and correct problems with the tool whether you are in the Peruvian jungle or on the Saskatchewan plains. The system has a built-in diagnostic that can help isolate problems to a replaceable component—i.e. the receiver card, the transducer, the radio modem, etc. A technician in our head office can help the driller on the platform interpret the diagnostic screen over the phone, or he can also view the screen via the internet (if the remote access feature is not the component at fault). This can often give instant feedback to the company man, since the tool doesn't have to be transported to the head office for diagnosis.

**Battery monitor:** Accurately displays the percentage of battery amp-hours remaining, eliminating the risk of the tool failing down hole due to an exhausted battery.



Remote Terminal

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