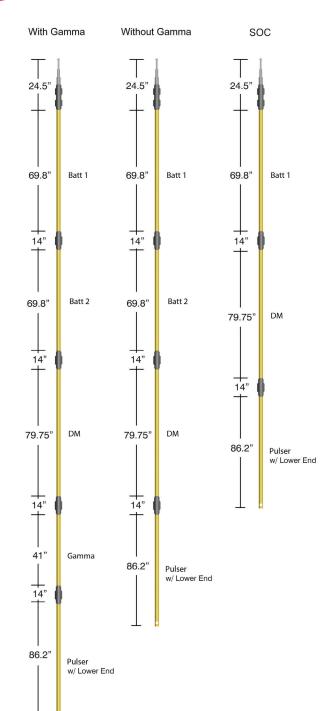
STANDARD MWD SYSTEM

Retrievable MWD System, Directional & Gamma Ray Logging Services



Fulfill the telemetry needs of challenging wells by providing reliable and faster data transmission to optimize drilling

Capable of running as 'directional only' as well as 'directional + gamma ray' MWD

Can be use in HPHT wells up to operating range of 175° C temperature and 20,000 psi pressure

Features

- Best MWD Solution offering directional, gamma & tool temperature sensors
- Run in highly deviated wells, DLS up to 109°/100 ft unachievable through other MWD Systems
- Widest flow range for any MWD System (50 gpm – 1200 gpm)
- Long battery life up to 400 hours making it a great choice for deep and long runs
- Available in 3-1/2" to 9-1/2" collar sizes
- Positive mud pulse telemetry with very quick tool face updates–17 seconds
- Capable of short period (1.5 minute) directional surveys
- Advanced synchronization algorithm, advanced noise filtering and signal decoding techniques
- Highly accurate and sensitive measurement of direction and gamma rays
- Accurate directional measurements make anti-collision scans more reliable

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Standard MWD has high memory capacity up to 600 hours for recorded gamma ray, depending on gamma ray sampling rate.

Capable of measuring up to 20 samples per minute (programmable).

Standard MWD has highly sensitive and accurate toolface, inclination and azimuth measurements making it capable of targeting the sweet spot for maximum reservoir production

Standard MWD has UBHO sub and probe based tool configuration, Probe O.D is 1 7/8"

Geological applications

- Determine shale volume
- Identify casing or coring points
- Improve log interpretation and reservoir modeling
- Determine formation tops
- Depth determination
- Well offset correlation
- Lithology identification
- Estimate clay content in sands and limestones
- Make better geosteering decisions from faster and continuous MWD real-time data

MODULAR MWD SYSTEM OVER	/IEW
Availabale Sensors	Directional, Gamma, Tool Temperature
Tool Configuration	UBHO Sub (muleshoe) and probe
3	3-1/2" to 9-1/2"
Tool O.D. (availability)	109° / 100 ft
Max Dogleg Severity	
Max Operating Temperature	175° C (347° F)
Pressure Drop Across Tool	Flow loop / calculated (water): 118 psi
Max Hydrostatic Pressure	20,000 psi
Flow Rate 70 ft/sec	Low as 50 gpm (2.2" collar I.D.)
	Up to 1200 gpm (3-1/4" collar I.D.)
SYSTEM OPERATION	
Telemetry Type	Positive mud pulse
Survey Transmission Time	90 seconds
Tool Face Update Rate	17 seconds average
ABSOLUTE ACCURACIES	
Gravity Tool Face	+/- 0.05° to +/- 3.0°, Programmable
Poainting Accuracy	$0.15^{\circ} = 2$ ft per 1,000 ft displacement
Magnetic Tool Face	+/- 0.05° to +/- 3.0°, Programmable
Azimuth	+/- 0.1° (inclination > 5°)
Inclination	+/- 0.1°
Crossover to High Side Tool Face	Programmable to any value desired (5° is typical)
Repeatability	Inclination +/- 0.05°; Azimuth +/- 0.05°
Readout Resolution	Inclination 0.1°; Azimuth 0.1°; Tool Face 1°
Gamma Sample Rate	One per 1.8 seconds measured 20 per minute in downhole memory. Programmable.
Gamma Memory Capacity	120 - 600 hours as function of program
TOOL DIMENSIONS	
Directional Only	31 ft/ 197 lbs
Directional + Gamma	35.6 ft/ 229 lbs
Tool O.D.	1-7/8"

Cost-effective, immediate results

- Retrievable tool, which saves rig time and cost by avoiding POOH for MWD
- Enable operators to make critical sidetracks with greater confidence
- Increase BHA longevity for longer runs through good signal detection
- Consumes very low power
- Achieve well plans with high doglegs
- Ideal for deep and longer runs due to its long battery and high memory capacity
- Economical and low maintenance cost
- Easy to mobilize and replace
- Equipped with downhole temperature sensor

