DATA SHEET

Logging while drilling

HALLIBURTON

FEATURES

- Industry's first 3D detection capability up to 50 ft ahead of the transmitter
- Industry's shortest distance to bit ultra-deep resistivity sensor
- Combined shallow and ultra-deep resistivity readings
- Adjustable ultra-deep depth of investigation
- Integration into the iCruise® intelligent RSS
- Phase shift and attenuation resistivity from three spacings at two frequencies
- Azimuthal resistivity image and geosignals
- R_v, R_h, and relative dip at any hole angle

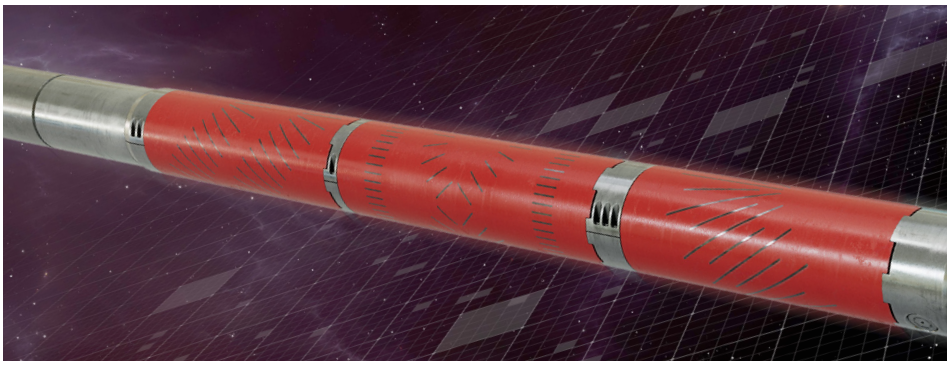
BENEFITS

- Geomap and geosteer ahead and around
- Geostop prior to hazards
- React earlier to unforeseen geological or fluid changes
- Stay within the productive zone
- Map formation structures and fluid distributions in 3D
- Acquire accurate near-bit formation resistivity for detailed formation and fluid characterization
- Obtain formation anisotropy for improved reserves evaluation
- Eliminate the need for conventional resistivity tools
- Reduce BHA length and handling time

EarthStar® 3DX

Horizontal look-ahead 3D resistivity service

Unlock reservoir potential ahead of the bit with 3D ultra-deep boundary mapping



Overview

The EarthStar® 3DX horizontal look-ahead 3D resistivity service delivers the industry's first real-time, look ahead 3D geological insights in horizontal wells before they are penetrated by the bit. This helps operators anticipate formation changes, optimize well placement, and maximize asset value.

Look ahead 3D geology ahead of the bit – in horizontal wells

EarthStar® 3DX provides real-time, three-dimensional geological insights ahead of the bit, — unlike conventional reservoir mapping. Integrated with the iCruise® RSS and positioned just 9 ft (3 m) from the bit, it enables earlier detection of formation changes and timely trajectory adjustments.

Operators can geosteer, geomap, and geostop with greater precision by continuously mapping dips, faults, and boundaries. This improves wellbore placement, reduces premature reservoir exits, minimizes corrections, and enhances overall drilling efficiency that can save time and increase asset value.

Informed well placement decisions, made sooner

Accurate well placement is critical in maximizing reservoir contact and hydrocarbon recovery. By mapping geological changes ahead of the bit in real time, the EarthStar® 3DX horizontal look-ahead 3D resistivity service gives operators the guidance to adjust the well path early to account for geological variability–in front of the bit and around the sides–along the well path instead of reacting after formation changes occur. This results in higher net-to-gross ratios, fewer reservoir exits, and improved production efficiency, keeping the wellbore in the most productive zone.

Detect and avoid hazards

In high-angle, horizontal, and extended-reach wells, the EarthStar® 3DX horizontal look-ahead 3D resistivity service helps avoid unexpected geological or fluid changes that can lead to wellbore instabilities and expensive corrections. The EarthStar® 3DX horizontal look-ahead 3D resistivity service detects hazards ahead of the bit, such as formation changes, faults, or fluid boundaries, before they impact drilling. This proactive risk management allows operators to adjust the trajectory early, reduce wellbore instability risks, avoid costly sidetracks, and facilitates a safer, more efficient drilling operation.

Evaluate and characterize reserves early

The EarthStar® 3DX service offers detailed conventional resistivity readings that support in-depth petrophysical analysis of the reservoir. Phase shift and attenuation resistivity are measured over three spacings at two frequencies with an array of electromagnetic sensors and the 24-in. crossed-antenna spacing. The spacing gives operators real-time R_v and R_h values and dip relative to the well at any angle. The combination of digitally compensated resistivity with formation anisotropy measurements near the bit drives early fluid characterization and a more accurate water saturation calculation to improve reserves evaluation.

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EarthStar® 3DX horizontal look-ahead 3D resistivity service technical specifications

MECHANICAL SPECIFICATIONS	6.75 IN.	8 IN.
Nominal tool OD	6.75 in. (171 mm)	8 in. (203 mm)
Maximum body OD	7.45 in. (189 mm)	8.62 in. (219 mm)
Hole size range	8.375 to 10.625 in. (213 mm to 270 mm)	10.625 to 16 in. (270 mm to 406 mm)
Collar ID	1.92 in. (48.8 mm)	2.38 in. (60.5 mm)
Length - stand-alone	20.40 ft (6.22 m)	20.75 ft (6.32 m)
Length - iCruise® RSS integrated	13.80 ft (4.21 m)	13.90 ft (4.24 m)
Weight - stand-alone	1,897 lbm (862 kg)	2,800 lbm (1272 kg)
Weight - iCruise® RSS integrated	1,670 lbm (755 kg)	1,747 lbm (794 kg)
Connections	4.5 IF (NC50) (box up x box down)	6.625 REG (box up x box down)
Make-up torque	30,000 to 33,000 ft-lbf (4070 to 4475 daN·m)	43,000 to 48,000 ft-lbf (5830 to 6505 daN·m)
Maximum dog leg severity - rotating	10°/100 ft (10°/30 m)	8°/100 ft (8°/30 m)
Maximum dog leg severity - sliding	21°/100 ft (21°/30 m)	14°/100 ft (21°/30 m)
Maximum drilling or operating rotary torque	33,000 ft-lbf (4475 daN·m)	48,000 ft-lbf (6510 daN·m)

OPERATING LIMITS		
Temperature range	32 to 302°F (0 to 150°C)	
Maximum pressure	25,000 psi (172 Mpa)	
Maximum mass flow rate (gpm x ppg)	10,000 lbm/min (4540 kg/min)	20,000 lbm/min (9000 kg/min)
Maximum sand content	2%	
Maximum RPM	400	
Maximum WOB	45,000 lbf (20 000 daN)	65,000 lbf (29 000 daN)
Vibration	Refer to Sperry Drilling Downhole Tools Technical Specifications and Operating Limits (available on request)	

MEASUREMENT SPECIFICATIONS	
Measurement type	Electromagnetic Wave Propagation
Measurement range	0.05 – 5000 Ω·m
Operating frequencies	16-, 24-, and 32-in. spacings: 500 kHz, 2 MHz Ultra-Deep spacing: 2, 4, 8, 16, 32, and 64 kHz
Measurement accuracy (2 MHz, 32 in. spacing)	1 Ω·m: ± 0.2%, 10 Ω·m: ± 0.3%, 100 Ω·m: ± 0.8%, 1000 Ω·m: ± 4%
Azimuthal bins	32
Measure point from bottom of collar	Ultra-Deep Resistivity: 3.27 ft (1.00 m) Compensated Resistivity: 7.27 ft (2.22 m)
Measure point from bit (iCruise® RSS integrated only)	Ultra-Deep Resistivity: 8.99 ft (2.74 m) Compensated Resistivity: 12.99 ft (3.96 m)

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

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